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THE CHARACTER AND RELATIONSHIP OF CRIMINALITY, DELINQUENCY AND FEEBLEMINDEDNESS*

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It is to be presumed that everyone has certain ideas about criminality, delinquency and feeble-mindedness. Frequent statements as to their relation are often encountered. It is my purpose to discuss certain phases of this subject rather briefly. The question is not wholly medical, but an application of philosophy and common sense judgments.

Criminality hardly needs definition. It usually refers to those who have violated the law and have been convicted. In a broader sense, however, it should also include those who are presumed to have committed offenses but have not been convicted by any court.

Delinquency is used to gather in those of loose moral principles and behavior and general carelessness and probable laziness.

Feeble-mindedness, I am going to try and divide into two forms, although this is not customary.

Symmetrical feeble-mindedness, the ordinary kind designated, refers to a general lack in all the spheres of the mind's activity—the lack of attention, the lack of judgment as one of the most prominent things, the lack of reasoning power and a lack of ability generally. The emotional state is not necessarily lessened or abolished, but it is usually under poor control. Rarely are there prominent delusions or hallucinations, exactly like those of the insane.

Then I would, for the purposes of the article, describe *asymmetrical* feeble-mindedness. In general phraseology this would include persons in whom there were certain lines of considerable ability, but other lines either of feeble-mindedness or of what are called perversions—perversions of moral state, perversions of sexual state, perversions

of emotional state. This group is, of course, ill-defined and not fully and scientifically recognized and the patients are not always called feeble-minded. Yet they are more closely linked to feeble-mindedness than they are to insanity and, in my judgment, are most accurately grouped in this way. The central idea associated with imbecility is not so much the kind of talk and behavior, as that it is inborn—is a life-long trait.

This much for definitions. The question then arises, is feeble-mindedness a cause of criminality and delinquency, or, conversely, does criminality indicate that the person is feeble-minded or insane. Some of you will have read articles in the "World's Work" by French Strother detailing such latter connection. Taking up the first statement, I would express an opinion which naturally cannot be backed up by any exact statistics, that a feeble-minded person may be either moral and conscientious, or immoral and criminal,—and I would assert that the feeble-mindedness does not by any necessity or great probability cause criminality. There are quite a number of convicted criminals in St. Cloud and, to a certain extent, in Stillwater who are feeble-minded. Of course, this feeble-mindedness is usually of so high a level that they have been able to live outside up to the time of their crime. But it is my idea that there are in every community a considerable number of people who are living quietly, probably working and living conscientiously, who are more or less feeble-minded of asymmetrical or symmetrical type. One who is familiar with the population of a town, especially a small town where all people are known, will recognize the fact.

Looking at it from the opposite direction there are at Stillwater and St. Cloud a few feeble-minded of symmetrical type, more of an asymmetrical type, and they probably have some also of mild degrees of insanity. All these have been committed by the courts and therefore are not gross idiots or imbeciles.

*Read before the Nicollet and Le Sueur County Medical Society, December, 1924.

As to asymmetrical feeble-mindedness, there have been, I believe, one or two prominent musicians (Ole Bull has been mentioned) who were talented in music and yet are said to have been feeble-minded. There are, however, more of a different type, some of which are linked with insanity. Feeble-mindedness grades up towards insanity.

I might mention an example of a young man sent to the Rochester hospital who was said to have once been on a lecture bureau committee. He was a fluent talker with a rather bright way about him and appeared unusually intelligent and quick. His history revealed that he had been in the habit of keeping company with girls, becoming engaged, making preparations for marriage even to the point of papering the house and selecting the furniture—and then failing to appear just at the last. He had moved from place to place and done this several times. It was hinted that he had had one or two affairs which were not so reputable. At the time of being committed he was married and his wife appeared. She had been deceived. In spite of his history of having studied medicine and various subjects it was demonstrated that although he went to doctors' offices he would not study. It was afterwards learned that from youth up he had been queer. He had certain sexual peculiarities, had had trouble at home, had been turned out of school because he failed to learn. His life had evidently been a succession of shams. Remember, that this man appeared unusually bright, intelligent and quick. Nevertheless, instead of thinking of this as a case of paranoia or pure perversion, I always thought of him as being born that way and constitutionally feeble-minded of the asymmetrical type.

You have read of cases of sexual perversion. Instances of emotional perversion are reported. We have had two young men at St. Peter who had committed murder. One, who killed an aunt on the street for no known reason, was so intelligent that at first they would not commit him as insane. He had been arrested six months previous for bothering some girls, but had generally been quite well behaved. He did not show any moral compunction or regret and professed in an intelligent way that he did not know why he did it. A distant relative of his said he had always been an "owlish" sort of fellow, but we could obtain only the vaguest sort of idea as to his childhood state. His mental state was called paranoia, also dementia precox, but

there were no paranoid ideas that I know of and I knew him several years. I always thought of him as belonging to an asymmetrical branch of feeble-mindedness. However, one fact is in opposition to this classification in his case, I am forced to admit; for he gradually improved and finally left us in what was apparently a fair mental state.

You will not clearly get my idea as to mental states unless you admit something which legally is not supposed to exist and that is *degrees of feeble-mindedness* as well as degrees of insanity. Legally, an individual is supposed to be either feeble-minded or normal. Practically, we have grades of mentality ranging from the grossest idiot up through the moron and out into society. Out in society we hear a man spoken of as not very bright, another as having poor judgment, another as queer, odd or erratic; yet when we appear in court, we have to testify that a person is either feeble-minded or normal, is insane or normal. The late intelligence tests, however, try to demonstrate a status almost mathematically graded from the grossest imbecility, which they hardly test at all, up to the normal and, in fact, on to the super-normal. In a way, the matter of gradation is fully admitted, but in general practice is not admitted and is not fully recognized legally anywhere.

Insanity has the same general aspect. An individual is insane or normal, just as he is sick or well. But everyone knows that "sickness" means anything from a trifling headache to a delirium and unconsciousness. When a physician testifies in court that a man is too sick to appear, it is practically admitted that the physician has made some judgment as to the degree of sickness. When a man testifies in court that a man is insane, no such admission of a degree is assumed, although there is somewhat of a gradation upon which to base such a conception.

If a given man at a given time has to be fully sane or fully insane, then insanity would be an instantaneous lightning-like change on one side of which he would be sane and the other insane. Manifestly, no such thing happens. Many cases are over a period of years growing into the mental state in which they are finally adjudged by the court to be insane. Or in the case of children. They are admittedly and quite manifestly not of mental standing below the age of one year. They are admittedly of age and sanity and mental ability

at the age of twenty-one. No one imagines that this change was instantaneous at any one time.

There is another complication in the case of insanity in that certain states of delirium, drunkenness, and certain better classes of epilepsy do not receive the name insanity, although a distinct mental change has taken place. In regard to this, a recent editorial, in connection probably with the trial of the murder of Frank in Chicago, asserted that soon experts will be able to adjudge the thirty-second degree of responsibility. This article was probably a little satirical. I wish to state, however, that we are not able as yet to set up a series of modified states in court and modified punishments to fit the states. Certain concessions are made sometimes on account of youth, etc., but they are not legally adjudged. It is probably best, at least for some years to come, to adjudge the person sane or insane as in the past; the same is true of feeble-mindedness.

The proper procedure at present is exemplified by the case in which a doctor goes into court and certifies that a patient is too sick to appear. In a similar way we, according to present practice, go into court and testify that the person is feeble-minded, meaning that he is too feeble-minded to take a legal status as normal; or that the person is insane, meaning that he is not sane enough to have the legal standing of sanity.

Practically, this is what is done. Practically, also, a legal decision is based on what one can find out as to past behavior and talk. The feeble-minded or insane person, moreover, who behaves all right and gets along all right with everybody is not disturbed.

Another essential idea to get, however, is that all this is a matter of opinion and must *necessarily be so*. One testifies to it as it being his *opinion* that the person is feeble-minded or not. In making up his opinion, conceding that it is perfectly honest, he also in imagination establishes some standard by which he will say that the person adjudged feeble-minded is on the wrong side of this standard or line of division. Of course, opinions may differ and standards may differ somewhat and thus opinions may not always agree.

The real fundamental, however, in all this is the conceding of gradations—gradation of feeble-mindedness, gradation of insanity. Some thirty years ago I wrote an article outlining this and it received no debate or comment. I questioned a leading

neurologist and he said the time was not yet ripe to consider such. No one denied it. People generally are afraid of the subject, obvious as the conception seems to us. Theologians are afraid of it because it tries to impair the essential element of individual responsibility. Legal elements are afraid of it because, fully recognized, it would confuse and impair legal decisions of responsibility. Society generally is not accustomed to consider or concede it and to the class who read and think very little, it might and would bring confusion of thought and impairment of feeling of responsibility.

Modified responsibility is as yet only conceded when we speak of little children or when we speak of the person who is obviously delirious. It applies in modifications of sentence in the cases of those who are youthful. However, recently, writers on eugenics and the tests which they have used have outlined all gradations from the idiot up to the super-intelligent and thus have made a wide opening wedge toward the admission of gradations. However, this does not yet appear in any legal proceedings. In a legal statement *everybody* wishes a *positive* statement and the witness or the physician also of necessity makes the statement positive, as is exemplified in the case of a physician testifying that the man of bodily sickness is unable to appear. There seems to be no very practical way of getting away from this. If in the case of bodily sickness, for example, the physician would go on the stand and testify in a half-hearted way that the person, if he was obliged to, *could* understand something—*could* sign papers or *might appear*, neither the court nor the people would wish that sort of talk. He must be decisive one way or the other.

Now, in conclusion, I will admit that this subject came to mind in connection with the murder of the boy Frank by the two young boys in Chicago and from the reading of the various comments. It is a perfectly feasible and allowable question to ask: Were these two boys responsible and should they according to law have been put to death? Of course, not knowing the two boys and their history, I cannot make any positive statement. I would state, however, that I thought they ought to be hung as guilty of the most cold-blooded and cruel murder ever discovered. I, however, said this because I think their hanging was for the safety of society and because escaping execution

by reason of plenty of money and smart lawyers is very greatly to the detriment of society and may have far-reaching bad effects when so prominently advertised.

You will perhaps say, however, that the main question is: Were these boys in any way mentally affected? Here again I am going to dodge a little, also because I do not know them and because the newspaper testimony was not fully decisive and left out the historical aspects of the cases. I will admit, however, the existence of occasional cases of asymmetrical lack of emotional normality or probably also of moral normality. The newspaper evidence in this case did not make it seem to me clear that these two boys were entitled to such concession. In our general idea of normal, however, their minds could not have been perfectly normal, because the crime itself contradicted what we consider a normal way of thinking, in its lack of object and lack of moral emotion. But if we adopt this way of thinking no planned crime of murder would be normal. We don't punish because of normality or abnormality, because of perfection or imperfection. My point is that I do not wish in any way to shield criminals because of such deviations from the normal. Criminals are punished not for themselves, but for the sake of society. If these two young men were hung it would not have been for themselves at all, but for

the protection of society. Even if we should concede a somewhat considerable deviation from the normal state, I would not advocate any remission of penalty.

I would conclude by a quotation from H. C. Wood on the subject of psychopaths in Pepper's "American Text Book of Medicine," 1893: "Perverse drifting almost of necessity into criminal eccentricities, such unfortunates are a long series of human atoms, whose faulty brain organization separates them from their more fortunate fellows. When this separation is sufficiently wide, when the mental organization is so bad that everyone can perceive that the man is the victim of his own imperfectly developed brain, he is said to be insane. But when the unfortunate individual is a little more like the normal human being, he is looked upon simply as eccentric, perverse or wicked, and, unloved or pitied, drifts through life, sometimes to poverty, sometimes to the hospital, sometimes to jail, and it may be to the hangman's scaffold. Sanity, insanity, criminality, power over self, free will, mental attributes—these and similar terms are household words with all of us, but no man knows whence they came, or what they are, or how far the individual is master of himself or driven by the hand of fate, as represented in the physical conformation of the nerve cells and fibres of the brain."

Many physicians have envied Sir William Osler his easy command of English writing. In the Osler Library is a collection of some of his manuscripts, showing the various stages in their preparation. First are notes on paper of various kinds, evidently written on trains and at opportune moments; then a rough outline in longhand; next the first typewritten copy with interlineations, transpositions and deletions; then the second typewritten copy, which also bears evidence of much modification, and, finally, a third typewritten copy, which evidently was used by the printer. Even this copy has three or four minor corrections.

Anatole France, Nobel prize winner in literature, said that seven revisions are necessary and an eighth desirable, in order to make sure that the corrections on the seventh have been understood. "In the first," it has been said, "he enlivened what had been platitudinous. The second was for 'weeding out the dandelions,' whos, whiches, and whoms. In the third, he eliminated the semicolons, shortened his

sentences, and struck out phrases which merely linked one sentence with another, or marked a transition from one thought to another, a task that should not be left to the reader. In the fourth draft he gave special attention to the order of sentences and to the repetition of the same word; he looked on the recurrence as a warning to rewrite the sentence, not to search for a synonym. The fifth draft saw the disappearance of adjectives, for he was of the opinion of Voltaire, that though the adjective might agree with the substantive in gender, number and case, very often it did not suit it. From the sixth draft he chipped away what he called the pastry, all that was adventitious and redundant, and over the seventh draft he passed the plane, for, he said, a good writer is like a good cabinet maker—he planes his phrases smooth."—George H. Simmons and Morris Fishbein, Jour. Am. Med. Assn., May 16, 1925.

ASEXUALIZATION: A REMEDY FOR CRIME AND CRIMINALITY*

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Mankato, Minn.

Much is being written concerning increase of crime and its cause, jurists asserting that the United States is the greatest criminal nation on earth. This is a terrible indictment and is in marked contrast to the situation one hundred years ago, when we were noted as the most moral and least criminal of nations.

Such impeachment raises the question as to what we are coming to if we continue to slip backward in this manner and what will happen to us in another hundred years? Are we complacently looking forward to another heavenly visitation with the hope that the wise ruler of the universe will make an exception in our case? If so, then we have another guess coming.

In 1876 the writer's attention was first attracted to this subject in a pamphlet which fell into his hands, advocating asexualization as a *remedy and punishment for crime and criminals*.

Later, in 1888, Dr. Orpheus Everett called attention to the procedure in an address before the Cincinnati Academy of Medicine; again in 1894, Dr. F. L. Senn read a paper before the Tennessee State Medical Society and on both occasions it met with approval. In 1896, I had the privilege of calling the attention of the Minnesota Valley Medical Society to the subject, but nothing definite followed until 1897, when the Indiana legislature passed a statute legalizing asexualization, and, we are told, 188 inmates of the Jefferson Penitentiary were operated. However, the governor then in office, disapproving, presented the matter to the supreme court, which declared the law unconstitutional and the remedy was therefore abandoned.

Recently, we are informed, sixteen states have taken up the matter suggested as a means of curtailing certain undesirables, and have enacted statutes permitting sterilization of idiots, imbeciles and lunatics when they become wards of the state or when permission by parents or guardians is obtained. Minnesota, after wrestling with the problem, at its last legislative session joined the procession; but nowhere do we learn that any state

so far has included the class of the greater menace—the criminals.

We believe that many criminals are without question the victims of inheritance where the tendency may have remained dormant throughout several generations and in some of whom it might be difficult to trace; but more generally the manifestations have been active.

Scientists have given us to understand that there is in every life-giving cell a certain characteristic inheritance, but that environment, cultivation and education may modify or prevent its manifestation. When left to himself, however, each individual reverts to his original inherited characteristic.

Since every effort as yet instituted during the last 6,000 years for crime control has been futile, is it not time that we bestir ourselves and try some new method and see if we cannot reach the fountain head—"the mare's nest" as it were—and stop the propagation of criminals? We believe the time is ripe for an innovation and that every state should institute some such means by law enactment and enforcement.

In asexualization, we have at hand a sure means of curtailing propagation, and a deterrent, efficient as any other known means, if not superior to even the death penalty, so frowned upon by super-sensitive philanthropists.

The voluntary deliberate criminal by his own wilfulness and acts voluntarily deprives himself of any civic rights or sympathy. As long as he is unrepentant he is an enemy of society, the state and nation.

Jurists who have studied the primary causes of crime call attention to the growing apathy of the public towards punishment of law infractions and an unwillingness on the part of a majority of our people to respect the laws themselves, or to teach their children respect for lawfully constituted authority. Perhaps much of this apathy is due to our having too much law; we have become surfeited with it. We have only to glance at the tendency of our past legislatures and the number of new laws they have enacted. The majority of us do not and cannot know what the laws are and thus cannot avoid incurring penalties.

Such, however, are not the only reasons why crime is rampant. We have in the past been altogether too lenient as to who should be admitted from other shores to our own. Many came seeking a haven from prosecution or escape from the re-

*Read before the Blue Earth County Medical Society, Mankato, Minn., September 28, 1925.

sults of misdeeds abroad and have mingled with our own undesirables to multiply ad libitum. It is high time we called a halt to this.

Maudlin sympathy should bear no weight when degenerates or criminals forfeit liberty and citizenship by their conduct. I speak of the deliberately wilfully disposed, not of the one who may have broken the law through misfortune or accident and who may, through repentance or mild punishment, reform.

The laws of the jungle and of criminal gangs are strictly enforced. Why should society be any the less tolerant or lenient towards its enemies?

The betrayer of chastity should forever carry the brand of Cain on his brow and be corralled, castrated and turned loose, to be frowned upon by every passerby. It may be noted that in Biblical times eunuchs held important and responsible positions and were esteemed worthy.

The expense incurred arresting, paroling, convicting and caring for criminals is appalling and will, if the present rate of increase obtains, soon cause bankruptcy of our great and glorious country. From Literary Digest columns we glean that such activities are costing the United States ten billion dollars a year and that of late the increase has been a billion a year. How much longer can we stand this strain and burden or tolerate the cause which necessitates this outlay in supporting criminals.

A single illustration among thousands suffices to show the results in one family in which, in eight generations, were born 180 illegitimate children, 233 notably immoral women, 190 men, of whom nineteen were epileptics, twenty-four insane, and forty states-prison and jail convicts. New York spent \$89,000 arresting, jailing and caring for forty of these who became denizens of her jurisdiction.

Our jails and reformatories necessary under present conditions are inadequate and prove post-graduate schools for newly admitted inmates, perfecting them in the intricacies of modern methods of operating, in avoiding capture and punishment, and in providing means of escape from the clutches of law.

Three years of intimate observation of a large reform school taught the writer of the almost useless efforts of reformation by aggregation, and its disadvantages compared with individual segregation of such inmates. It was our privilege to have

had four paroled inmates in our family, each of whom of their own accord admitted that they learned more cussedness and devilment within the walls of the institution than they ever knew or suspected previous to their admission.

Municipal and state authorities do not hesitate to quarantine lawfully against contagious and infectious diseases; why not then against these other agencies more destructive than plague or pestilence whose ravages are unceasing through hereditary descent?

To those who for any reason oppose the death penalty for any crime, no matter how heinous, we suggest this method as a substitute, in the belief that the majority of such would prefer the death penalty. The plea that such action interferes with personal liberty has no force, for such an individual by his own act has already forfeited all liberty of choice or action whatever.

Laws are supposed to be enacted for the protection of the masses and not for individuals who by chance or volition become a law unto themselves.

Marriages of defectives should be prohibited and the law as sternly enforced as are nature's unlettered laws. When the career of each defective has ended, society will then no longer be perplexed and burdened by that individual.

"No pestilence that ever walked in darkness, or destruction that wasted at noonday, has ever done greater harm to mankind than the ever destructive power of hereditary degeneration of brain and mind." Such are the expressions of a noted alienist, before mentioned, as long ago as 1888, and, as yet, but little has been accomplished by the profession in the eradication of this deadly menace, in comparison with what has been accomplished in amelioration of disease, and in prophylaxis. While crime virus is more potent than any other and has greater destructive powers, we have given it but little attention. Continued neglect will certainly bring at no distant day the misfortunes which befell Sodom and Gomorrah.

So great has become the demand and necessity for housing the erring, in our attempt thereby to protect society, that our jails and reformatories and asylums are overflowing and we have been unable to cope with the demand. By the means suggested, those guilty of rape become altered beings and are thus spared to ruminate on the past and speculate on the future, unhampered by un-

restrained lust or passion; for the constitutionally depraved, it promises slowly but surely to diminish their number, to the extent of its application, by destroying reproductive possibilities and transmission of imperfections to coming generations.

We believe those who attribute criminal increase to the late war to be in error; for few, indeed, are the malefactors among returned soldiers, who, if they were capable of learning anything in the service, learned respect for authority, self control and obedience. Such is seemingly lacking in the criminal class which we are told is largely made up of the youth of today who were mostly too young to have served in our late war.

Total moral depravity has been said by some to have no existence. This I believe is a mistake, as any one who has had much experience in reform school work will have to admit. I once knew one who was not loth to speak emphatically of his conviction on this score, but a three months' employment as yardman in a reform school convinced and converted him entirely.

For such depravity there are only the alternatives of annihilation, life confinement or emasculation; there is no reform.

Switzerland and Italy have been practicing sterilization for years and have thereby eliminated many of their dependents. Why may we not be even as successful and even go them one better by applying it to the criminal classes, also?

I opine that only ultraconservative minds will object, for even they make no objection to its being cruelty to animals when applied by breeders in a preservation of the fittest, and in making the unmanageable obedient and willing servants of man. The vicious and uncontrollable bull becomes the patient stag and why may not the same remedy restrain unruly man?

Glancing back over fifty years since my attention was first called to this remedy, I observe that but little attention has been given to the subject and that principally by members of the medical profession. They too have been somewhat slow in adopting it as a means of preventive medicine to the same extent as they have been interested in preventing disease, and as a class I think have not given the matter the attention it deserved.

I am pleased to note that the public and the press of late have become interested in advising ways and means of curtailing crime increase and are advocating more strenuous measures of punishment and more activity in bringing offenders immediately under the ban of law.

The need is urgent and it is my belief that when the powerful factor of public opinion is sufficiently aroused, it will unitedly enter into the educational ranks to stimulate action sufficiently to abolish what has heretofore seemed an impossible task by devising some new methods which will be effectual; in asexualization they will find a potent remedy.

BERLIN WELCOMES AMERICAN PHYSICIANS

To the Editor:

We wish to call your attention to an article appearing in the Journal of the American Medical Association, January 16, Department of Foreign News, under the title, "Berlin Faculty Decides Against Official Welcome to American Physicians," copied from a German Medical Journal, dated December 11, 1925.

The reason given by the Faculty of the Berlin University for this action was on account of the exclusion of German physicians from taking part in International Medical Congresses.

There is no doubt that this was the attitude taken by the Faculty of Berlin last fall, but many things have transpired to strengthen our International relations since that time. The condition at the present time is entirely different.

The first of this month we received assurance from both the German Government and the Faculty of Berlin that the members of the Inter-state Post Graduate Assemblies, who will visit Berlin, June 15, 16 and 17, will receive a most hearty welcome. These greetings were received following several months of discussion between the represen-

tatives of the German Government, the Faculty of the University and representatives of this Association, especially with Dr. Carl Beck, Secretary of the Foreign Assemblies of this organization, who is now in Europe completing the final clinic arrangements for the 1926 assemblies. . . .

Following the publication of the article above mentioned, we cabled Professor Bier, the chairman of the Berlin clinic committee of this Association, to give us a statement so that we could speak authoritatively. The following is a copy of Professor Bier's answer:

Berlin, January 21, 1926.

"William Peck,
Freeport, Illinois.

Under the stated circumstances heartiest welcome. Letter follows.

BIER."

In bringing about this understanding we believe we have advanced largely the spirit of International good fellowship in which this organization is deeply interested.

Very sincerely yours,

WILLIAM B. PECK,
Managing-Director
Inter-state Post Graduate Assemblies.

ANTI-TUBERCULOSIS WORK IS WINNING*

H. LONGSTREET TAYLOR, M.D.
St. Paul

Forty years ago the profession of medicine was awakening to a realization of the fact that Koch's discovery of the tubercle bacillus and his classical demonstration that tuberculosis was a communicable disease had laid a heavy burden upon their shoulders. Villemain's experimental proof of the communicability of tuberculosis had been known since 1865. A century before Koch's discovery, the kingdom of Naples had declared phthisis to be a contagious disease and attempted to obliterate it by the most stringent and oppressive laws—burning their habitations and destroying their personal property, thus making outcasts of all consumptives. These measures failed because the cause of the disease was unknown and every shot was fired in the dark.

In the twentieth century anti-tuberculosis crusade no such excuse is possible. Have we succeeded any better than the Neapolitans did in the eighteenth century? There are a number of people who say we have not.

We are accused of illogical reasoning and of inaccurate methods. Many claim that the widespread and continuous decline in the general death rate in the past seventy-five years explains the decrease of tuberculosis deaths. Others maintain that this decrease is due to a diminishing virulence of the tuberculosis germ, although a diminishing virulence has never been shown in laboratory work. The improvement is ascribed to progress in social and economic conditions, better water supplies, sewage disposal, and a higher standard of living generally. The claim is also put forth that an inherited immunity has finally come to the rescue of mankind, although throughout the centuries that tuberculosis has preyed upon the human race no trace of such development had appeared. Laboratory animals can be immunized, but not in utero (Krause).

The statistician has also put his oar into these troubled waters and has discovered that the efforts of the health authorities to curb the morbidity and mortality rates have been without appreciable results, and that the rise and fall of the tuberculosis

death rate has behaved in many ways like that of other communicable diseases.

The explanations of the declining death rate are at times contradictory. Early in the century anti-tuberculosis work was criticized because the eugenists declared that if our work succeeded the results would be a great reduction in the average health of the public. The offspring of the unfit and sub-standard individuals, who had been cheated of their right to early graves, would greatly lower the average resistance of the race both against tuberculosis and other diseases. But today we hear that the lowered death rate is quite evidently due to an increased inherited resistance, since tuberculosis has become all but universal.

It behooves some of us, who have dedicated our lives to this work, to take these criticisms very seriously, to analyze them dispassionately, and to see if our work has been nothing but propaganda while the real gains have come about quite in accordance with natural development and without any assistance or speeding up from us.

Koch's discovery of the cause of tuberculosis turned an army of research men to work on every phase of the subject. This enormous amount of work so rounded out the exact knowledge of the life history of the bacillus of tuberculosis that a scientific basis for an international scheme of prevention was gradually evolved.

Today the following program has been adopted at least in those countries where anti-tuberculosis work has been markedly successful:

1. Notification of all cases to health authorities.
2. Free sputum examinations by public laboratories.
3. Tuberculosis dispensaries.
4. Sanatoria for the treatment of incipient cases.
5. Preventoria for the treatment of infected children.
6. Hospitals for the segregation and treatment of far advanced and dying cases.
7. Working colonies for arrested cases under medical supervision.
8. Follow-up work on all cases uncovered by the above activities: examination of contacts; discovery of new cases; supervision and instruction of discharged cases.
9. Education of the public.

*Read at meeting of the staff of the Lymanhurst School, Minneapolis, November, 1925.

10. The control of bovine tuberculosis: testing herds of cattle and pasteurizing milk supplies; official inspection of slaughter houses and their products and of food handlers.
11. Child welfare work also belongs here.

The notification of all cases to the health officer for registration and sanitary supervision is the foundation on which all epidemiological tuberculosis work is founded. The follow-up work and examination of contacts uncovers many more cases. Endemic centers in large cities cannot exist under the publicity which follows these investigations. Such, for example, as the infected Philadelphia houses reported by Flick, the houses of death so designated by the authorities of Paris, and Sir Robert Philip's nests in Edinburgh.

The greatest assistance is offered by the public health authorities in the free sputum examinations by state, county and municipal laboratories, both to the practitioner and health officer.

The public dispensaries, working with the health authorities and their follow-up agents, accomplish the same epidemiological work of recording cases and examining suspects; in short, of going out and finding the tuberculous population.

The clinics conducted in the rural districts by the anti-tuberculosis and public health associations, supported in the United States by the sale of Christmas Seals, are performing the same service for the farmer and settler in sparsely settled regions as dispensaries do in the cities and towns. A county nurse to follow up the cases discovered in the rural clinics is absolutely necessary if all contacts are to be examined and the patients persuaded to be treated.

The public sanatoria for the incipient cases is the next step beyond the dispensary and rural clinic. The only alternative is home treatment. Home treatment is a misnomer. Among families ignorant of the rules of hygienic living, as the majority of people are, whether rich or poor, home treatment usually leads to dissemination among all the susceptible members of the family and offers but little to the patient.

The experience of the last two generations has founded the tremendous advantages of the sanatorium treatment upon a rock far more secure than Gibraltar both as to results for the sufferer, the protection of the other members of the family, and

from the standpoint of the public health authorities.

Preventoria for infected children is the fifth article on the list. It is also a strictly sanitary measure and has a high coefficient of usefulness in an anti-tuberculosis crusade.

Preventoria admit undernourished, poorly developed children, who have been in contact with open cases of tuberculosis in their homes or elsewhere. These children all show a positive von Pirquet reaction, but are not clinically active cases of tuberculosis.

Preventorium cases, if not discharged too soon, usually remain well through the years in which tuberculosis is most apt to appear. The preventorium is too young for statistics to have accumulated over a sufficient space of time to show more than this.

Hospital care for the far advanced and hopeless consumptive, the sixth subdivision of our program, is of the greatest importance from a public health standpoint. It is only while being hospitalized that these unfortunates cease to be a distinct danger to their families and friends.

Just as rigid quarantine of all cases of smallpox and of all contacts is an epidemiological measure, so is the care of these advanced cases in hospitals, and the search for other cases among contacts. General hospitals are awakening to the need for and value of hospital accommodation for this class of patients.

There are now between 65,000 and 70,000 beds in institutions in the United States for the care and treatment of consumptives. This large number of beds saves many lives, and prevents many infections by the segregation and instruction of this army of patients.

A properly trained conscientious patient is a safe inmate of any home.

In Minnesota all county and district institutions are required to give precedence to advanced cases. The State Sanatorium is reserved for incipient cases and, as far as possible, the advanced case is excluded.

Working colonies for arrested cases under medical supervision, or as a department of a large state sanatorium, round out the plan and insure the ex-patient from relapses.

Follow-up work, under the banner of the sanatorium, to keep in touch with its ex-patients and to guard them from the excesses and indiscretions

that lead to relapses, is not nearly as effectual as the working colony, because, necessarily, the supervision is intermittent.

The education of the laity on the nature of the disease, the necessary anti-tuberculosis measures and the results already obtained, is a vital provision. Only last year the National Tuberculosis Association reaffirmed the value of the old anti-spitting campaigns and urged the continuation of such efforts. They were of great value not only from a hygienic standpoint but also from that of refinement and good breeding. The same kind of work must be continued, especially among children—teaching the liberal use of sunshine, fresh air, sports in the open, proper food, and last, but not least, long hours of sleep. The housewife must be taught home economics and the modern science of nutrition to make this more effective. This education must be given from the lecture platform, by the social visitor or district nurse, by radio, in the movies, in the daily papers, in public health periodicals published for circulation among the laity such as, *Outdoor Life*, *Hygeia*, *The Northwestern Health Journal*, and others, and during the seal sale annual sermons on this subject would be appropriate from every pulpit. In short, wherever and whenever an audience, interested in this subject, can be gathered together, a speaker competent to give the facts of its occurrence and means of propagation should be provided.

Human and bovine tuberculosis are very closely related. Since dairy products and fresh meats are found on every table, the presence or absence of the bovine bacilli in them is a matter of the highest importance. The tuberculin-tested herds and pasteurized milk and inspected packing and slaughterhouses have proved to be safeguards against the infection of children from these sources. How successful these safeguards are is demonstrated daily in the clinic and dispensary where tuberculous cervical lymph nodes, for instance, are now met with very infrequently when compared with their prevalence twenty-five years ago.

Every one of these items in our program is both in the interest of the individual sufferer and an aid to the work of the health authorities.

Has this program, when efficiently carried out, shown positive results?

This entire program is a liberal education in hygienic living. The open-air sanatorium, preventorium, school rooms constitute object lessons to

the communities in which they are located. The follow-up workers are health instructors in every family they enter. The education of the laity through the written and spoken word has proved to be a powerful force that has seldom been called on in vain. The end result must be to lower morbidity rates from many diseases and thus indirectly to lower the general death rate.

Dr. Louis I. Dublin of the Metropolitan Life Insurance Company's staff says: "The acceptance by the general public, as well as by the professional health workers, of the proposition that the health program has been effective is based on solid rock. It is right and wise that communities shall tax themselves more and more heavily to prevent disease and to prolong life. There will be troubles enough for health officers to obtain the support of their communities in view of the ignorance and lethargy of the uninformed and of the opposition from the blind cults whose program is anti-health. It is a pity that in the struggle, always difficult, for the adequate support of health activities, there should be need also to meet the criticism of the devotees to science and truth, and of the very teachers of the new generations of health officers. Man's greatest achievement in the last half century should not be belittled without reason."

These critics Dr. Dublin refers to usually declare and quite logically, considering their standpoint, that a recrudescence of the high mortality rates of the past may be expected. Unless this happens their disciples will soon begin to doubt that they have been sitting at the feet of prophets.

In New York City the fall in the tuberculosis mortality from 1910 to 1920 amounted to 55 per cent. It was due to an intensive co-ordinated campaign including all branches of anti-tuberculosis work: registration of all cases; sanitary supervision throughout the course of the disease; laboratories; municipal sanatoria; forty-one clinics; nursing service with instruction of cases in homes; two hospitals and a subsidized private hospital; a number of beds reserved in the State Sanatorium in the Adirondacks; one hundred and twenty open-air classes for children; preventoria; education of the public by local, state, and national tuberculosis associations, resulting in the population of the city actually aiding the authorities in waging war on tuberculosis and the causes predisposing to it.

The Tuberculosis Committee of the City of New York, however, declared that specific measures

were secondary to fundamental changes in environment and habits, largely brought about by their education of the public. Taken in conjunction with the results which have universally followed the successful application of such an anti-tuberculosis program in other places, it is safe to say that if they had not put on their specific and wide-flung campaign the reduction would not have been anywhere near 55 per cent.

Sir Robert Philip of Edinburgh writes: "During fifty years, while the death rate from all disease was reduced by less than half in Scotland, the tuberculosis death rate was reduced by two-thirds." He points out that this decrease increases, from decade to decade, from 17 per cent in the first to 27 per cent in the fifth. This is also true for the United States. The 1900 rate was 195, the 1910 rate was 165, and the 1920 rate 112, or 46 per cent less than that of 1900.

If this decline be due to natural causes or to the generally improved hygienic conditions, why is it most marked where the most intensive anti-tuberculosis work has been done?

Dr. J. H. Elliot of Toronto says: "Now a word as to the possibilities of organized effort in the control of tuberculosis. The Framingham demonstration has shown what can be accomplished in a short time by intensive effort. Similar results may be obtained in any community without undue expenditure of public funds. Our experience in Toronto amply confirms this. We have in Dr. Hastings an energetic health officer, who has preached for years that public health is a purchasable commodity, that with a well organized service the death rate may be lowered in proportion to the public funds reasonably expended for the combat of such infections as tuberculosis."

"There are sanatoria and hospitals for early cases and for advanced cases, hospitals for tuberculous children, preventoriums, open-air and forest schools for those not clinically tuberculous, clinics for diagnosis, treatment or other disposition of cases, visiting nurses for supervision and follow-up, a system of compulsory notification which is the start of a search for contacts and sources, associations of clinics to secure uniformity and avoid duplication of work, auxiliary associations to aid the poor in their homes and provide for families in which the breadwinner is ill, with other agencies for the discovery, control, and prevention of the

disease. In 1900 Toronto's death rate was over 250 per 100,000. Now with a population of 600,000 its rate is sixty-five per 100,000, the lowest death rate of any of the larger cities in America."

Dr. Frank Billings, in an address to the Minnesota State Medical Association in 1925, said: "There were 76,298 deaths from tuberculosis in the United States in 1921, a decrease of fifty per cent of the annual deaths in twenty years. This result has been due to a consistent, constant anti-tuberculosis campaign, characterized by rational individual hygiene and splendid medical management."

Haven Emerson declares: "That the wide discrepancies in the burden of deaths tolerated by different communities are not accidental, but result from controllable factors of environment and human relationships, is known to physicians and economists.

"The reductions where they have occurred are due, and in proportion, to the consistent effort and intelligent direction in the prevention and treatment of the disease."

Dr. Robinson Bosworth, in his report on the anti-tuberculosis work of Minnesota, points out that the death rate of counties, without a county institution, or the clinical and educational work done by the staff of each county institution in its own district, but with the State Sanatorium for its favorable cases, had a fall of 17 per cent in five years. In those counties that had both a county and state institution the fall was 27 per cent in the same space of time, showing that the percentages rise and fall with the amount of work being done in different localities.

In the last ten years, during which time the number of beds has passed the annual number of deaths, the decrease in the tuberculosis mortality of Minnesota has been 37 per cent.

Take the marvelous results of the Framingham demonstration, which shows a decrease of 68 per cent in the tuberculosis death rate as compared with the pre-demonstration period, which, to be thoroughly appreciated, must be compared with the decrease of 32 per cent in control towns. The Milbank Memorial Fund, encouraged by these successful examples, is doing the same work on a much larger scale.

Professor Allen K. Krause says: "The most remarkable chapter in the history of medicine is

the one detailing the achievements of the anti-tuberculosis work. No such record of the deliberate planning and carrying through successfully of an attack upon a widespread plague can be found in medical history.”*

The International Anti-tuberculosis Campaign is a success. It has more than justified itself wherever it has been properly applied. This has only been done in communities anxious to co-operate in every way and willing to pay for the enormous benefits it offers.

*From the lecture delivered to the Koch Society, Chicago, October, 1925.

THE COUNTRY DOCTOR

If you can set a fractured femur with a piece of string and a flatiron and get as good results as the mechanical engineer staff of a city hospital at 10 per cent of their fee;

If you can drive through ten miles of mud to ease the little child of a deadbeat;

If you can diagnose tonsillitis from diphtheria with a laboratory forty-eight hours away;

If you can pull the three-pronged fishhook molar of the 250-pound hired man;

If you can maintain your equilibrium when the lordly specialist sneeringly refers to the general practitioner;

If you can change tires at 4 below at 4 A. M.;

If you can hold the chap with lumbago from taking back rubs for kidney trouble from the chiroprac:

Then, my boy, you are a Country Doctor.—H. W. Davis, in the *Kansas Medical Journal*.

Incitamin Not Acceptable for N.N.R.—In the information submitted to the Council on Pharmacy and Chemistry by Lehn & Fink, Inc., it is stated that Incitamin is a “standardized preparation of equine saliva, freed of coagulable substances”; that “each cubic centimeter contains 12 units of Ptyalin”; that it is preserved with 1 per cent of chinosol. It was stated to be indicated in the treatment of indolent ulcers. Entirely different statements as to the composition were made on the trade packages and advertising. Here it was stated: “Incitamin is a mixture containing saliva (equine), serum (also equine), and pancreatic extract. . . . It is preserved by the addition of one-half of one per cent of phenol.” The Council found Incitamin unacceptable for New and Non-official Remedies because the statements of composition are contradictory; no data are given as to the amount of equine serum and pancreatic extract present; no data of any kind are given that the ingredients (whatever they are) have any action (except perhaps the phenol or chinosol); and so far as the evidence goes, it is an absurd and unscientific mixture. When the Council’s statement was sent to Lehn & Fink, Inc., the firm replied that Incitamin formerly contained “saliva, equine serum and pancreatic extract,” but that the formula had been changed to a “standardized preparation of equine saliva.” (Jour. A. M. A., Dec. 12, 1925, p. 1907.)

X-RAY STUDIES OF INTESTINAL TUBERCULOSIS*

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The commonest and most dreaded complication of pulmonary tuberculosis is intestinal tuberculosis. The infection in most cases is from bacilli swallowed in the sputum. Recently it has come to be realized that intestinal involvement frequently occurs in moderately advanced and even in some early pulmonary cases. Its onset may be unheralded and when such classical symptoms as persistent diarrhea, abdominal pain, tenderness, rigidity or local thickening occur the process is already far advanced. It is now believed that its occurrence can be detected much earlier and that treatment promptly instituted and consistently followed up may result most happily.

There are several early symptoms which we now know should suggest intestinal involvement. One is failure to improve in spite of quiescence or improvement in the lung lesion. A stationary or retrogressive general condition for no apparent cause should make one watchful at once. If in addition the patient complains of slight persistent nausea, of anorexia and a feeling of discomfort after eating, one’s suspicions should increase. Constipation and gaseous indigestion are said to be early symptoms. Webb and Gilbert,¹ and Stewart² speak of undue nervousness as often present in these cases. Stewart emphasizes the value of the combination of nervousness, anorexia and constipation as an aid in diagnosis.

A slight irregular rise of temperature, often normal, but sometimes 99.5 or more, may be present.

Abdominal examination in some instances reveals localized thickening, which may be accompanied by tenderness. This frequently does not occur until later in the disease.

Severe pain is not an early symptom. Cramps occur later in the disease and are sometimes relieved by fasting.

Diarrhea at first transient and later severe and continuous is usually present in advanced cases, but may be due to other causes than tuberculous enteritis.

*Read before the St. Louis County Medical Society, Duluth, September 10, 1925.

The finding of tubercle bacilli in the stools is of no value, as they are usually present in the feces of patients who have positive sputum. The occurrence of either pus or blood in the stools is common in the later stages of enteritis, but both may be lacking.

Walsh,³ in 1909, as the result of clinical and post-mortem studies at the Phipps institute, concluded that the diagnosis of intestinal tuberculosis could not be made with any degree of certainty from symptoms. That was before the use of x-ray methods.

While the earlier symptoms just mentioned may all be absent in proven cases of tuberculous enteritis and may be present in other conditions, their value as strongly suggesting the diagnosis has now been established by their occurrence in connection with positive x-ray findings. In fact, our greatest aid in the diagnosis of early intestinal tuberculosis is x-ray examination of the passage of a barium meal through the alimentary tract.

The appearances characteristic of intestinal tuberculosis were first noted by Stierlin⁴ of Basel. He found that in cases of stricture of the lower end of the ileum as well as of induration and ulceration of the wall of the cecum and ascending colon the intestinal contents pass so rapidly through the inflamed areas that demonstrable filling defects become easily recognizable. In all of the seven cases he reported in 1911 the diagnosis was confirmed by operation.

Archibald and Pirie⁵ of Montreal seem to have discovered "Stierlin's phenomenon" independently. Dr. Pirie, roentgenologist of the Royal Victoria Hospital, reported in 1917 his observations made in 1914 as follows:

"Dr. Archibald has asked me if I could write from memory a summary of my findings in tuberculous conditions of the intestines. I do so with pleasure, as it was the most interesting work I did for about a year before the war began. Writing as I do without notes from a base hospital in France, I well remember the disappointment we had, as in several successive cases of tuberculous cecum I failed absolutely to help in the diagnosis. Some bad luck seemed to dog my steps, for whereas we had formerly been able to show by means of a barium meal the position, shape and size of the normal cecum, yet we failed, in these tuberculous cases, to catch the cecum at the proper time when it was filled by the meal. Finally, the cause of our failure struck us. We could not show the cecum filled by a barium meal because it never did fill when tuberculous ulceration existed. Setting out with this as a working hypothesis, we examined the cases at half-hour intervals from four to twelve hours after the barium meal. We

found our theory correct in each case of tuberculous cecum, namely, the cecum never filled up with the meal. Each small squirt of barium that left the ileum was quickly passed on past the cecum and collected elsewhere in the large colon, either in the transverse or the descending part. So that our conclusion was, that in a tuberculous subject with symptoms suggesting tuberculous cecum, if the cecum did not fill from four to twelve hours after the barium meal when examined at intervals of about half an hour, then this want of filling confirmed the diagnosis. On the other hand, when it did fill as it does in a normal individual, it negatives the diagnosis of tuberculous cecum. We had this latter experience confirmed in one case where a clinical diagnosis of tuberculous cecum had been suggested; the x-ray showed a cecum filled by barium, and at operation a non-tuberculous cecum was found."

In 1919, Brown and Sampson⁶ of Saranac Lake reported the examination of 110 cases by this method. They held that an x-ray examination in a patient with pulmonary tuberculosis which showed hypermotility, spasm or filling defects should lead to a definite diagnosis of colonic tuberculosis. According to these investigators conditions other than ulceration of the cecum or ascending colon do not produce this rapid type of hypermotility with its peculiar attending features. Cases of acute or habitual diarrhea did not show it nor was it found after catharsis. From a study of the prints of Imboden and Spriggs they believed it was possible to exclude definitely disease of the appendix as a cause.

Carman⁷ of Rochester, Minnesota, states that absence of the barium shadow may be found in ulcerative carcinoma and in chronic ulcerative colitis, but tuberculosis has such a predilection for the ileocecal coil that a lesion in this part of the intestine associated with pulmonary tuberculosis is most likely tuberculous. The local acceleration and gap in the barium shadow he believes does not represent true hypermotility due to increased peristalsis, but is the effect of diffuse infiltration of the bowel wall producing rigidity. The physiological functions of the diseased segment of the colon being lost, the barium passes through without hindrance just as it does through a stomach diffusely infiltrated with cancer. Carman believes that the roentgen ray furnishes the most certain means yet available for the diagnosis of intestinal tuberculosis.

Paterson⁸ of Saranac Lake cites twenty-two cases confirmed by operation and considers x-ray study to be of great help in the diagnosis of tuberculosis of the cecum and large bowel, of at least as much

help as the *x-ray* examination of pulmonary cases.

Pritchard⁹ and Stewart² both endorse the method, the latter reporting 1,100 *x-ray* studies of 900 patients at the Manitoba Sanatorium.

On the other hand, Schwatt and Steinbach,¹⁰ after checking up an unspecified number of cases with autopsy findings, have not been uniformly convinced as to the alleged great value of this method of diagnosis.

Webb and Gilbert,¹ while acknowledging that an *x-ray* examination has been of great assistance in the diagnosis of early cases of intestinal involvement, warn against too great reliance on negative findings, as they believe the *x-ray* may fail to detect the earliest phases of tuberculosis, especially when confined to the small intestine. They believe that the diagnosis can in most cases be made without the *x-ray* from a careful consideration of digestive complaints and that the fatigue incident to the examination may occasionally do harm.

The technic of the examination is not difficult. In the Mayo Clinic⁷ the enema is ordinarily employed, though the ingested meal is also used. Archibald and Pirie, the pioneers in this work in America, used the ingested meal ordinarily and the enema only occasionally. Brown and Sampson, Paterson, Stewart and others who have used the *x-ray* examinations prefer the barium meal by the mouth to the enema.

In our series the enema was not used. Our technic, which is practically the same as that employed by Stewart at the Manitoba Sanatorium, consists in giving 4 oz. of a specially prepared barium meal with the routine breakfast at 7 A. M., after which no food or water is taken until 6 P. M. The patient is examined with the fluoroscope five hours after the ingestion of the meal and if it is considered necessary a plate is taken. Routinely, plates are taken at nine, eleven, and at twenty-five hours. This procedure is more satisfactory than the observation of the patient after only two to five hours and again after six to eight hours. It will be seen then that the examination cannot very well be made in a physician's office or the general hospital unless arrangements are made for *x-ray* service at the proper hours. The examination of the nine and eleven hour plates gives the most valuable information. All medications, especially cathartics, are discontinued for at least three days before the examination.

The normal stomach empties itself in from three to five hours. The head of the barium meal reaches the ileocecal valve in from one to three hours. The ileum empties itself in from two to four hours after the ingestion of a meal. Six hours after taking the meal the head of the column is seen at the hepatic flexure or splenic flexure. Complete evacuation of the meal takes place in about thirty-six to forty-eight hours. The cecum remains well or partially filled from the fourth to the thirty-sixth hour.

In cases of tuberculous enteritis the barium usually passes through the large bowel with great rapidity. Often complete evacuation has occurred within twenty-four hours. The cecum and lower part of the colon seem to pass along the material as rapidly as it is received. The usual haustral sacculations are lacking. The affected portions are only partially filled and have a distinctly ragged and irregular appearance. Instead of the evenly filled cecum and colon with the sharp clear-cut outline and normal haustral markings, the ulcerated area presents an irregular outline with somewhat fuzzy edges and narrowing of the diameter of the shadow. Occasionally, the barium meal seems to be delayed at the ileocecal valve, possibly by spasm (ileal stasis), but once in the colon to be hurried through it in the manner described. Occasionally, the outline of the cecum is smooth, but lacks haustral markings and the whole cecum is uniformly narrowed. The three pictures, hypermotility, filling defects and ileal stasis, are said to be especially characteristic of ulceration of the cecum and ascending colon. Spasm of the musculature of the colon is also suggestive.

In this series of seventy-three cases examined all but four had pulmonary tuberculosis. Thirty-nine had far advanced disease in the lung; twenty-nine had moderately advanced pulmonary trouble and four had no pulmonary involvement. Of the thirty-nine cases with far advanced pulmonary disease, thirty-one showed positive *x-ray* evidence of intestinal disease, while of the twenty-nine moderately advanced cases only twelve showed such evidence. None of the four cases not having disease in the lungs gave *x-ray* evidence of intestinal tuberculosis.

The average duration of the pulmonary disease in the positive cases was less than a year in twenty-three cases and more than a year in twenty-one. In the negative cases the duration of the pulmonary

disease was less than a year in twelve and more than a year in twenty-nine.

The x-ray evidence of disease consisted of hypermotility in forty-four cases and filling defects in forty-four. One case without symptoms showed hypermotility and one a filling defect. Seven cases diagnosed as tuberculous enteritis showed gastric retention, as did four considered as not having an intestinal complication.

The occurrence of symptoms in those showing x-ray evidence of intestinal tuberculosis and in the negative cases is indicated in the following table:

SYMPTOMS OF TUBERCULOUS ENTERITIS

Symptom	X-ray Positive	Per-	X-ray Positive	Per-
	centage	centage	centage	centage
Pulmonary lesion.....	44	100	24	83
Not doing well.....	28	64	13	45
Nervousness	11	25	3	10
Anorexia	34	77	10	34
Abdominal discomfort.....	31	70	9	30
Flatulence	17	39	2	17
Pain	18	41	10	34
Vomiting	8	18	2	7
Constipation	21	48	14	48
Diarrhea	18	41	6	20

As regards results of treatment, as our series of examinations was begun only about six months ago it is early to expect definite x-ray evidence of healing. Of the forty-four patients examined eighteen are symptomatically unimproved; sixteen are improved and ten are dead. Paterson reports that some of his patients who have given positive x-ray pictures lost their symptoms and later failed to show any x-ray evidence of disease. That tuberculous ulcers may heal is indicated from the post-mortem studies of Schwatt and Steinbach.

Our resources in the treatment of intestinal tuberculosis include rest, diet, heliotherapy, medicines and surgical measures. The exclusion of the diseased area by surgical means or its total excision has been successfully accomplished in some cases. Paterson reports twenty-two cases operated upon with improvement in ten cases. It is, however, impossible to determine the extent of involvement and all such operations must be considered as exploratory. The prognosis is bad in advanced cases, as these are usually accompanied by extensive pulmonary disease. If the diagnosis can be made sufficiently early it is probable that as good results can be obtained by the adoption of hygienic and other measures not as radical as the surgical pro-

cedures. The routine x-ray examination with the barium meal of every case of pulmonary tuberculosis with prompt treatment by rest, diet, and heliotherapy of all positive cases would, we are convinced, result in the arrest and eventual healing of the tuberculous intestine in many early cases. In certain more advanced cases in good general condition surgical treatment may be indicated.

IN CONCLUSION

With the aid of the x-ray it is possible to diagnose tuberculous ulceration of the colon near the cecum, which is commonly one of the first sites of tuberculosis of the intestines, much earlier than formerly.

Every patient with pulmonary tuberculosis should be given a barium test meal or enema in order to determine the presence of Stierlin's phenomenon.

The prognosis of tuberculous enteritis in the early stages is not absolutely unfavorable and satisfactory results may be anticipated from the use of hygienic measures, and heliotherapy. In certain special cases surgical intervention may be desirable.

CASE REPORTS

Case 1.—J. H., farmer, age 22, admitted July, 1924. Pulmonary disease far advanced. Pulmonary symptoms were never severe, but at no time has he done well. Much under-weight and loss of strength. In February, 1925, began to have an elevation of temperature. Complained of indefinite abdominal pains and intestinal flatulence. Has continued to lose weight.

X-ray plates showed hypermotility with filling defects of the cecum and ascending colon. Has had more rigid rest treatment and diet control and has been given lamp and sun treatment with drugs to control intestinal hypermotility and cramps.

Case 2.—G. R., laborer, age 47, admitted June, 1923. Pulmonary classification—far advanced.

Pulmonary symptoms were slight and he carried on very comfortably till January, 1925, when he began to have an elevated temperature and lose weight continually. Pulmonary symptoms were not increased and x-ray plates did not show any increase of disease. No abdominal discomfort was complained of till June, 1925, when he had loss of appetite, slight abdominal pain and intestinal flatulence. Appetite became progressively worse, pain increased, temperature remained elevated and weight decreased. Symptoms were relieved by giving barium.

X-ray plates showed the small bowel empty at nine hours, cecum irregular and contracted and never well outlined.

Case 3.—A. S., age 20, laborer. Admitted August, 1925. He had been diagnosed as having tuberculosis six months earlier, but continued to work till admission. Pulmonary

X-RAY STUDIES OF INTESTINAL TUBERCULOSIS

condition very far advanced. Had some abdominal symptoms on admission consisting of anorexia and slight discomfort after meals, but symptoms were not severe enough to be complained of.

X-ray examination shows hypermotility with poor filling of the cecum and ascending colon.

Case 4.—R. K., painter, age 46. Entered Nopeming July 23, 1925. Pulmonary symptoms were very slight, though he had far advanced disease. Had a double orchitis with discharging sinuses. Sputum positive. Was under weight and ran a normal temperature till early in July, when his temperature became irregularly elevated with no increase in pulmonary symptoms. Began to lose weight rapidly. Appetite was fairly good, though he had a sensation of fullness in the abdomen and loss of appetite. Vomited at times and had a good deal of intestinal flatulence with rumbling in the abdomen. Began to have attacks of pain in the abdomen, slight and not very troublesome, relieved by taking paregoric. Bowels were constipated, but later had some diarrhea.

X-ray plates show hypermotility of the large bowel with the cecum poorly filled in all plates taken.

Case 5.—A. A., age 23, carpenter. Admitted November, 1923. Pulmonary condition far advanced. At no time since admission had he done well. Pulmonary symptoms troublesome and in July, 1924, he began to have anorexia and pain, but no bowel irregularity. Gained weight for a few weeks after admission, but later began to lose. In February, 1925, began to have increased abdominal discomfort and diarrhea which more or less persisted till the time of his death following hemoptysis in April, 1925.

X-ray plates showed marked filling defects of cecum, ascending and part of the transverse colon.

Case 6.—O. A., towerman on railway, age 26. Admitted July, 1924, with far advanced disease. Pulmonary symptoms severe. Underweight and loss of strength marked. Began to have abdominal symptoms in November, 1924. Appetite

What force is it that has induced more than three hundred of the most representative citizens of Minneapolis to leave their own firesides and to forego all other engagements that they might foregather here this evening? Was it the fact that a certain man has lived for many years in our midst and has devoted himself throughout this period to a life of public service? I do not believe so. Was it the fact that this man in the course of his lifetime has accumulated a large fortune? I do not believe so. Was it the fact that he gave a considerable share of this fortune to provide for the relief and care of crippled children? I do not believe that this is the reason why we are here.

But the real reason is far deeper, far more fundamental, far more universal than any of these. We are here to pay honor and tribute to one who has found the magic alembic for which the ancients sought, the philosopher's stone which transmutes the baser metals of the world into fine gold. He has used this stone to transmute the gross material wealth of the world into the social gold of spiritual values. He gave his money to the schools and to the University to be used perpetually for the education and relief of physically handicapped children. How fine it was that he sensed the profound truth that education makes for culture, health

poor. Gastric distress and bowels irregular and later some diarrhea. Continued to lose weight and strength. Diarrhea became troublesome in February, 1925, and was accompanied by considerable abdominal pain. Condition became progressively worse till death in March, 1925. X-ray plates showed a gastric retention at eleven hours and a small bowel segmentation. Barium had not entered the cecum at eleven hours. Once inside the large bowel it was soon expelled.

Diagnosis of both tuberculous enteritis and colitis was made and verified at autopsy.

REFERENCES

1. Webb, G. B., and Gilbert, G. B.: Tuberculous enteritis, the dietetic management. *Tr. Nat. Tuberc. Assn.*, 1924, xx, 121.
2. Stewart, D. A.: Tuberculosis of the intestines. *Can. Med. Assn. Jour.*, 1923, xiii, 20.
3. Walsh, J.: Diagnosis of intestinal tuberculosis. *Tr. Nat. Tuberc. Assn.*, 1909, v, 217.
4. Stierlin: Die Radiographic in der Diagnostik der Ileozœkal Tuberkulose, *München. med. Wochenschr.*, 1911, lviii.
5. Archibald, E.: The rôle of surgery in the treatment of intestinal tuberculosis. *Am. Rev. Tuberc.*, 1917, i, 449.
6. Brown, L., and Sampson, H. L.: The early roentgen diagnosis of ulcerative tuberculous colitis. *Am. Rev. Tuberc.*, 1920, iii, 698.
7. Carman, R. D.: The roentgen diagnosis of diseases of the alimentary canal. Second Edition, Philadelphia, 1921, 562.
8. Paterson, R. C.: Intestinal tuberculosis. *Am. Rev. Tuberc.*, 1920, iv, 433.
9. Pritchard, J. E.: Tuberculous ulceration of the intestines. *Can. Med. Assn. Jour.*, 1924, xiv, 5.
10. Schwart, H., and Steinbach, M. M.: Tuberculosis of the intestines. *Am. Rev. Tuberc.*, 1923, viii, 9.

for happiness, both for progress; and that wealth in and of itself, unless used to promote human welfare, is dross. The true values of life are measured by its intangibles, i.e., by its ideals put to work. That modern business man who wins wealth and turns it to social uses, who directs it so that it adds to human happiness, is the long sought and greatly to be cherished philosopher's stone that transforms material possessions into spiritual returns.

It is this that Mr. Eustis has done. It is for this reason that we are here. Mr. Eustis gave and he gave as Dr. Folwell would say, "Like a prince." One of the fine things said about Columbus was that "an instinct of a continent stirred within him." And so it was with Mr. Eustis in the provision he made for his gift. The money gathered by one man will now be used for the benefit of hundreds and thousands of children year after year, decade after decade, generation after generation. The ancient alchemists sought a grand elixir which was to confer immortal youth upon the person who was brave enough to kiss and quaff the golden draught. Mr. Eustis has indeed gained immortal youth because his life's treasures will go on forever and ever ministering to youth.—Dr. Lotus D. Coffman, Minnesota Chats, Nov., 1925.

PULMONARY CIRCULATION*

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Gentlemen: When asked to speak to you on the physiology of respiration I thought it would be best to confine myself to one aspect of this subject and have chosen the pulmonary circulation. This subject probably presents more difficulties than almost any other one in the physiology of the circulation and respiration. However, some general considerations may help us.

The first point to bear in mind is that practically the same amount of blood must pass through the lungs in any given time as passes through all the other organs of the body. Likewise, the amount of blood going to these organs is dependent on the amount of venous blood going to the right heart. One of the most important advances made in regard to the physiology of muscle is that its power increases as the muscle fibers lengthen and vice versa. We have here a very effective mechanism for taking care of an altered inflow into the heart. Starling¹ and his workers have shown that the heart can pump out much more blood merely by increasing the rate of inflow into the right auricle. In Starling's experiments there was no change in the rate of the heart, the increased amount being due to increased output per beat, because increased inflow causes the muscle fiber to lengthen out. Likewise great increase of arterial pressures may be overcome inside of two or three beats by the same mechanism.

Most observers have found an increase of only three to five times in the blood flow through active voluntary muscle as a result of activity, although Krogh's² results show that at rest only about one per cent of the total capillaries may be open. According to most observers the increase of visible capillaries in voluntary muscle is brought about by what is termed an axone reflex working directly on the capillaries. Bayliss rendered it very probable that most sensory fibers bifurcate near their termination, one branch going to the sense organ, and the other branch going to the blood vessel. This view has been substantiated by the work of

Bruce and others on inflammation. This mechanism is set into action by activity of the part and is a very nice mechanism, as it insures a plentiful blood supply to an active organ. According to Krogh, this axone reflex mechanism works on the capillaries and not on the arterioles. Krogh found this mechanism many places in the body, but, so far as I know, the lungs have not been investigated.

It is certain, however, that the vessels of the lungs can readily accommodate much more blood than is ordinarily present in them, and the first point we may consider is the maximum capacity of the pulmonary circulation. Probably the best way to get the maximum capacity of the pulmonary circulation would be to get the maximum capacity of the right ventricle and multiply that by the maximum number of beats in a given time. In 1864, Heffelsheim determined the ventricular capacity in three adult males to be 143, 158 and 168 c.c. Recently, Periot³ found from 100 to 160 c.c. It is probable the ventricle does not quite completely empty itself at every beat, so if we take 150 c.c. as the maximum output, and 160 as the maximum rate, the maximum output could be almost 24 liters per minute. It is interesting to note that Krogh and Lindhard⁴ got outputs as high as 21.6 liters in severe exercise and as small as 2.8 liters during rest. This is an increase of about eight times. It is also interesting to note that Collett and Liljestrand⁵ found it took from 30 to 45 minutes of rest before the resting volume is obtained. Krogh and Lindhard's method is a difficult method, but is probably, in the hands of good workers, better than the x-ray method of following the size of the heart. This latter method has, however, brought out the fact that if the heart is accelerated enough there may be no increase in size in exercise.

We may arrive at similar figures from oxygen use. Severe exercise may increase the heat production about ten times. In severe exercise Hill has shown there is an oxygen lack which lasts for some time. Hill⁶ and his workers showed that if the exercise be moderate the respiratory quotient does not change, but if exercise is severe the respiratory quotient may go nearly to 2. This is due to the increase of lactic acid in the blood which reduces the alkali reserve and frees CO₂. Thus, one of Hill's subjects, lying down, produced 181 c.c. CO₂ and used 217 c.c. O₂ per minute, giving a respiratory quotient of .83. Now in stationary

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running, 276 steps per minute for two minutes, the same subject produced 3,080 c.c. CO₂ and used 2,400 c.c. O₂ per minute (a respiratory quotient of 1.29), taking into his lungs 72 liters of air per minute. This is an increase of 17 times in the production of CO₂ and a little over 11 times in oxygen intake.

All of these facts show the lungs are built to withstand very severe calls on them and that the circulation must accommodate itself. This fact was believed proven by the experiments of Lichtheim,⁷ who showed that one pulmonary artery and about half the branches of the other artery could be put out of action without a fall of arterial pressure. This, of course, meant that the blood which ordinarily goes through both lungs can be accommodated by one-fourth of the pulmonary circulatory capacity. This question was investigated by Kuno⁸ on a heart-lung preparation and he found that if the inflow into the heart was not excessive, ligation of one pulmonary artery had no effect on arterial pressure or output; but if the circulation was increased, then a decrease in arterial pressure and output resulted. It should be mentioned that two observers, Langraf⁹ in 1890, and recently Burton Opitz,¹⁰ found compression of even a small branch of a pulmonary artery caused a drop in arterial pressure. The only explanation I can see for their results is that either they had an excessive circulation or else they caused a reflex vaso-dilation—the depressor action. Dilation of the base of these large arteries is supposed to stimulate the ends of the depressor fibers and tend to relieve the high pressure by a vaso-dilation. It might be that their clamps stimulated this mechanism. It is interesting to note that McDowall¹¹ has described the opposite effect from the base of the great veins. When the venous pressure is low, section of the vagi causes a fall of arterial pressure, tending to show that impulses from the great veins were tending to keep up arterial pressure—a pressor effect.

Another much disputed point is the presence or absence of vaso-motor nerves to the lung vessels. I have not been able to find much reported about the minuter structure of the smaller pulmonary arteries and arterioles where one would expect vaso-motor nerves to have much effect. However, one general consideration must not be forgotten. As pointed out before, the amount of blood to the lungs is regulated by the amount the right heart receives. All vaso-motor nerves could do would

be to shift blood from one lobule to another. The question of whether there are such vaso-motor nerves has been reviewed recently by Wiggers¹² and by Schafer,¹³ and they believe the evidence is probably in favor of such nerves. Of course, if these nerves all caused contraction of the arterioles, at once the effect would be felt on the right heart and venous pressure rise. Schafer's work would seem to indicate they act independently of the vasoconstrictors to other organs.

Another extremely important point is what the expansion of the lungs in inspiration does to the blood vessels. Do the lung vessels hold more blood during inspiration than during expiration? What does collapse of the lungs do to the flow of blood through it? This problem has been attacked in a number of ways.

First, effort has been made to ligate the lungs at the end of inspiration and at the end of expiration. This method is not very satisfactory because of the difficulty of adjusting ligatures, etc., and keeping the pressure conditions normal. In large rabbits, Heger and Spehl¹⁴ found very little difference between the inspiratory and expiratory position and this has been the prevalent idea. However, by other methods, investigators have differed. These differences have come chiefly from perfusion experiments. In some of these the lung has been under negative pressure and as this negative pressure has been increased, more blood would naturally go into the lung in this condition. These individuals, forgetting the pressure conditions, have concluded that inspiration expands the blood vessels of the lungs. However, this is probably not correct. Those people who have kept the pressure conditions correct have not found increase of blood in the lungs¹⁵ during inspiration. What inspiration seems to do is to lengthen out the capillaries and thus reduce the bore. Cloetta's¹⁶ measurements of the capillaries of lungs fixed in inspiration and expiration are very definite. The capillaries have a much smaller bore in inspiration. The total volume of the capillaries would not be much altered. In the literature one frequently finds experiments criticized because people used artificial respiration. Now, a little consideration will show that it will make no difference whether one uses artificial or natural respiration. In natural respiration the high pressure is inside the lungs (intrapulmonic) and the low pressure outside (intrathoracic). The pressure to which the lung

vessels are subjected is the difference between these two pressures, probably 3-8 mm. Hg. ordinarily. Now in artificial respiration the larger pressure is again inside and the low pressure outside, and the difference between them is the same for the same expansion of the lung as in natural respiration.¹⁷ We may thus conclude that the degree of inflation of the lung will not have much effect on the total amount of blood in it, but will affect the ease with which blood will flow through the lungs, the narrowing of the capillaries in inspiration tending to hinder the flow of blood if everything else remained constant. However, in the normal animal, other things tend to overcome the effect of this narrowed capillary bed. The narrowing of the capillaries should tend to cause a fall of arterial pressure because of the increased resistance in the capillaries, but this effect is masked and completely overcome by the increased output of the right ventricle. The decrease of intrathoracic pressure caused by the enlargement of the thorax naturally causes an increased flow of venous blood to the heart and the right heart responds by an increased output. This increased output will be forced through the narrowed capillaries of the lungs and inspiration tends to raise arterial blood pressure. However, experiments have shown that these effects are not instantaneous. If one alters the venous inflow into the right heart by such an experiment as clamping the superior or inferior vena cava, one finds that there is no change in arterial blood pressure for about three beats. The same thing happens when the inflow into the right heart is increased. There is no change in the arterial pressure for three heart beats. Thus the reason there has been so much discrepancy as to the effect of inspiration and expiration on arterial pressure is due to the neglect of this latency.¹⁷ Everyone who has investigated has found a better venous inflow into the right heart as a result of inspiration. Now where this increased amount of blood will show up on arterial pressure depends on the heart respiration ratio. If one had a ratio of 6 to 1, the true effect of inspiration will show up in expiration and vice versa. This better filling of the right side of the heart and its increased output would probably account for the slightly more blood found by some observers in the lungs in inspiration and expiration.

Löhr¹⁸ has recently made an extended series of experiments on the circulation through the lungs by perfusion. In these experiments the mistake

is made that the perfusion pressure represented by the contraction of a rubber ball is kept constant while the pressure is varied in the lung. Naturally he finds an increased blood flow through the lungs when the pressure there is decreased. He also observed a markedly decreased flow through the lungs when they were compressed by pressure from outside, but I hardly think that Löhr's results can be applied to the living body as in collapse of one lung, although it stands to reason if you have increased pressure in one pleural cavity, more blood would tend to go to the other pleural cavity.

Wiggers¹⁹ and Schafer²⁰ have measured the pressure in the pulmonary artery, and both say inspiration causes a fall of pulmonary pressure, and interpret this as indicating larger vessels in inspiration. The tracings show a fall at first followed by a rise. The rise, I think, is the true effect of inspiration. However, there probably is a position of the lungs where the blood will go through the capillaries most readily. The expansion of the alveoli might straighten as well as narrow the capillaries. However, everything shows that the blood passes through the lungs readily in all conditions.

I may next take up the question of the amount of blood in the lungs. This must be a varying quantity. Heger and Spehl give one-twelfth to one-thirteenth of the blood on inspiration and one-fifteenth to one-eighteenth on expiration: that is, from 7 to 9 per cent. However, these figures must vary and in times of accelerated circulation there must be more. Kuno,²¹ with a heart-lung preparation, observed the amount increased markedly when the rate of inflow increased. With a small inflow he observed 8.8 per cent of the total blood was in the lungs, but when the flow was increased about three times, the amount in the lungs increased to over 19 per cent. If the lungs became edematous, he found over 25 per cent in the lungs. Figures resembling these high ones of Kuno have also been observed by Stewart.²² Stewart based his findings on the following considerations. The minute volume of the heart must equal the volume of blood in the lungs multiplied by the circulation time through the lungs. If any two of these factors be known the third might be calculated. Stewart calculated the circulation time and the output and found from 11 to 26 per cent of the blood in the lungs. When the aorta was blocked, the inflow into the right heart being unobstructed, the lungs

were found in one animal to contain about 22 per cent of the total blood and the heart and lungs in two other animals 27 and 30 per cent. It may be mentioned that Kuno found in dogs the circulation time in the lungs in a heart-lung preparation to vary from 1.8 to 4.4 seconds. Stewart, in dogs, found the time from the right heart to the aorta to be from 1.7 to 8 seconds, and Romm²³ from 4 to 10 seconds.

The next question to consider is that of the normal pulmonary blood pressure. This has been investigated by a number of different workers. Starling and Fühner²⁴ on their heart-lung preparation found that the pulmonary pressure rose with an increase of arterial pressure. Likewise, an increase of venous inflow into the heart tends to increase the pulmonary pressures, but only within what might be termed physiological limits. One must not forget the pericardium. This is made of fibrous tissue and therefore inextensible. Kuno²⁵ has shown that opening the pericardium causes a fall of venous pressure, a rise of arterial pressure and an increased output of the heart. Now if the pericardium is removed, the heart tends to over-distend and hemorrhages occur into its tissue. Because of its thin wall this affects much more the right side than the left. With the pericardium closed, Kuno observed that increased venous pressure always led to an increased pulmonary pressure, increased pressure in the left ventricle and increased output of the heart. However, if the pericardium be opened when the inflow becomes too great, an increase of venous pressure leads to a fall of pulmonary pressure and fall of left auricular pressure, and a decreased output of the heart. This means the right side of the heart is stretched beyond its physiological limits. It is obvious that the more rapid the heart beat, the less time for diastolic filling and therefore less time for over-dilation of the heart and less use for the pericardium.

Another very important point is the relation between pulmonary pressure and systemic pressure. Most observers find pulmonary pressure to be between one-fifth and one-sixth that of the systemic arterial pressure. Here we find a difference between those who have worked with the heart-lung preparation and those who have worked with the whole animal.²⁶ Those who have used the whole animal have found little relation between the two. A rise of systemic pressure does not produce any

change in the pulmonary pressure because of the increased efficiency of the left ventricle due to the lengthening of the muscle fibers. However, those who used the heart-lung preparation find that the rise of systemic pressure produces a rise in pulmonary pressure. This is not due to a back pressure effect, because a rise of systemic pressure does not cause a rise of pressure in the left auricle. The cause is due to increased coronary flow. Starling and his workers²⁷ showed that a rise of arterial pressure increased the flow through the coronaries. As much as one-third of the total output of the left ventricle may go through the coronaries with a very high aortic pressure. A rise of systemic pressure will thus result in an increased filling of the right ventricle, which will respond by increased output and a consequent rise of pulmonary pressure. This question needs reinvestigation on the whole animal.

An extremely important problem is the effect of various drugs on the vessels of the lungs. This has given rise to a great deal of work with varying results. We will first consider CO₂. Starling and Fühner²¹ observed in the heart-lung preparation when the arterial resistance is kept constant that asphyxia caused a very gradual drop of arterial pressure and then a sudden drop. The pulmonary pressure rises slowly and then suddenly. These results are to be explained on the loss of efficiency of the left ventricle. It gradually loses its ability to contract against this pressure. Löhr²⁸ studied the effect of gases by means of perfusion and observed CO₂ led to a constriction of the lung vessels. If adrenalin be added to the blood in place of constriction one gets a dilation. The most prevalent idea of the action of CO₂ on vessels is that its action is due to changes in H ion concentration. Increase of H ion concentration usually causes dilation, and decrease, a contraction of vessels. Löhr observed a remarkable effect of CO₂ on the muscles of the bronchi. In concentrations up to about 30 per cent, CO₂ dilated the bronchi, but above that per cent, caused a constriction of them. The percentage of O₂ breathed seems to have little effect on the pulmonary vessels. Chloroform and ether seem to cause a dilation of the vessels, but in large concentrations cause a constriction of the bronchial muscles. Nitrous oxide and ethyl chloride seem to dilate the pulmonary vessels without having much effect on the bronchi.

The action of adrenalin has been studied a great

deal with contradictory results. Löhr says that using the same sample of adrenalin, and under apparently similar conditions, sometimes constriction and sometimes dilation occurs.

Caffein, theobromin, papaverin, atropin and amyl nitrite, according to Löhr, cause the vessels to dilate and also the bronchi.

Before concluding, I wish to remind you of the bronchial circulation. Branches of intercostal arteries accompany the bronchi. It has been shown that part of this blood returns by the pulmonary vessels, but most is returned by the bronchial veins. It must be to this circulation and not to the so-called pulmonary circulation that we must look in repair of lesions affecting the larger tubes. Likewise, the question of lymphatics is of extreme importance. According to Miller,²⁸ we have lymphatics in the pleura and accompanying the bronchi, pulmonary artery and pulmonary vein, but there are no lymphatics around the pulmonary capillaries. In other words, one might say the lymphatics were bronchial rather than pulmonary. I will only remind you that an edema may be due just as much to a decreased flow away from the part as to increased production of fluid. In other parts of the body we have examples of each kind.

BIBLIOGRAPHY

1. Starling, E. H., and Knowlton, F. P.: *Jour. Physiol.*, 1912, xlii, 206, and numerous papers in *Jour. Physiol.* since.
2. Krogh, A.: *Jour. Physiol.*, lli, llii, lv. Also *Anatomy and Physiology of the Capillaries*, 1922, Yale Univ. Press.
3. Periot, M.: *Comp. Rend. Soc. de Biol.*, 1925, xcii, 615.
4. Krogh, A., and Lindhard, J.: *Skan. Arch. f. Physiol.*, 1912, xxvii, 100.
5. Collett and Liljestrand: *Skan. Arch. f. Physiol.*, 1924, xlv, 17.
6. Hill, A. V., Long, C. N., and Lupton, H.: *Proc. Roy. Soc. London B.*, 1924, xvi, 438.
7. Lichtheim, L.: See Tigerstedt *Ergeb. d. Physiol.*, ii, 1903. This review contains the older literature on pulmonary circulation.
8. Kuno, Y.: *Jour. Physiol.*, 1915, 1, 140.
9. Langraf: *Centr. f. Physiol.*, 1890.
10. Burton-Opitz, R.: *Am. Jour. Physiol.*, 1921, lviii, 226.
11. McDowall, R. J. S.: *Jour. Physiol.*, 1924, lix, 41.
12. Wiggers, C. J.: *Physiol. Reviews*, 1921, i, 139.
13. Schafer, E.: *Arch. Inter. de Physiol.*, 1922, xviii, 14.
14. Heger and Spehl: *Arch. d. Biol.*, 1881, ii, 153.
15. Bowditch and Garland: *Jour. Physiol.*, 1880, ii, 91.
16. Cloetta, M.: *Arch. Exp. Path. U. Phar.*, 1911, lxvi, and 1912, lxx.
17. Visscher, M. B., Rupp, A., and Scott, F. H.: *Am. Jour. Physiol.*, 1924, lxx, 586.
18. Löhr, H.: *Zeit. Ges. Exp. Med.*, 1924, xxix, 67.
19. Wiggers, C. J.: *Am. Jour. Physiol.*, xxx, xxxiii.
20. Schafer, E.: *Quart. Jour. Exp. Physiol.*, 1919, xii, 394.
21. Kuno, Y.: *Jour. Physiol.*, 1917, li, 154.
22. Stewart, G. N.: *Am. Jour. Physiol.*, 1921, lviii, 20.
23. Romm, S. O.: *Arch. Ges. Physiol.*, 1924, cciii, 113.
24. Starling and Fühner: *Jour. Physiol.*, 1913, xlvi, 286.
25. Kuno, Y.: *Jour. Physiol.*, 1916, 1, 1.
26. Anrep, G., and Bulato, E.: *Jour. Physiol.*, 1925, ix, 175.
27. Starling and Evans: *Jour. Physiol.*, 1912, xlvi, and Starling and Markwalder: *Jour. Physiol.*, 1913, xlvi, 275.
28. Miller, W. S.: *Am. Rev. Tubercul.*, 1919, iii, 33.

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CHRONIC BACKACHE FROM AN ORTHOPEDIC STANDPOINT*

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The treatment of manifest disease of the spine, such as tuberculosis, typhoid, syphilis, osteoarthritis, neoplasms or gross trauma is fairly well understood, and need not be discussed, except insofar as it may play a very important part in curing and relieving some cases of seemingly "simple" backache.

In the treatment of chronic back pain and disability we succeed or fail as we appreciate the underlying causes, or can understand (or perhaps imagine) the mechanism leading up to the disordered function in the back.

These patients complain oftenest of pain in one or both sacro-iliac regions, the lumbar, or the lumbosacral regions. In my experience, the frequency occurs in the order given. Many patients will tell us that a dull lumbar ache existed for many months and was followed gradually by pains localized over one sacro-iliac area; or a lumbar pain after light trauma was followed some weeks later by pain in the gluteal area of the same side, and still later by posterior thigh pains; or pains in the mid-lumbar area gradually set in, unassociated with trauma, to be followed somewhat later by pain in one sacro-iliac area and still later by posterior thigh and leg pains and a chronic course. Tenderness in one or another painful area may be associated. Some give a history of repeated similar attacks of varying duration; others of the attacks beginning with a "sudden catch" in the lumbosacral or sacro-iliac areas; or the attacks may be associated with a sensation of slipping or of giving way. In many the pain is worse on movement, as in turning in bed, walking, lifting, stooping or suddenly rising from a lying or sitting posture. In some the pain is worse when quiet, and better when moving and walking; and in others the pain is more or less constant.

Examination of these backs may show surprisingly little. Often movement in the back and lower extremities is limited. In many this limitation is of flexion of the spine only, extension being free.

In others all movement may be more or less limited. Flexion of the fully extended lower extremity at the hip is limited in many, and causes pain in the lower back or posterior parts of the thigh and leg. In some a strikingly flat back or lordosis in the lumbar and lumbosacral area may be noted; in others there is present as well a list of the body to one side or the other. These symptoms are undoubtedly the expression of muscle spasm which, after persisting, leads to structural changes and shortening in which other tissues take part.

Nearly two-thirds of the cases to come under my observation had posterior thigh and leg pain. This condition is often mistaken for sciatica. Much speculation exists as to its origin. That it is due to pressure or irritation of a nerve directly or reflexly, and that it is entirely muscular in origin, has been variously held. It has been my experience that these posterior thigh and leg pains occur nearly always in cases in which undoubted muscle spasm and contraction in the lower back and posterior thigh structures exist, strongly suggesting a relationship. The striking relief from pain sometimes obtained following measures directed against these muscle spasms and muscle contractions, as well as the development of these pains gradually or suddenly at varying intervals after a backache or a back injury, are very suggestive of such a cause.

Fixation of a painful joint by continued and sustained muscle action, is a matter of frequent observation; when this has long continued it results in more or less contraction of the muscle or muscle group. It can be presumed that the muscles act in an identical manner in guarding and fixing various injured and diseased areas. It is furthermore very probable that in many chronic cases the symptoms persist because of muscle shortening and contraction even after the original exciting lesion has healed. In most cases there is a distinct tendency to recovery sooner or later. Fatigue and chronic strain have a similar effect upon muscle tissue.

Helweg* has recently attributed these pains to a myopathy due to overwork in muscles by which fatigued products (lactic acid) produce organic changes within the muscle (myositis).

*Read before the Northern Minnesota Medical Association, Brainerd, Minnesota, August 24-25, 1925.

*Helweg, J.: Sciatica. *Acta Medica Scandinavica*, Copenhagen, Supplement X, 1925.

For some years past considerable study and attention has been given by French and American orthopedists, to the lumbo-sacral region, especially to its anomalies, the relationship of the fifth lumbar vertebra to the sacrum, and to the relation of the transverse processes of the fifth lumbar vertebra to the lumbar nerve roots (especially the fifth) of the sacral plexus. Removal of the processes on one or both sides has brought a high percentage of reported cures.

The sacro-iliac joints have for many years played a prominent part in the discussion of low back disorders. Strains and subluxations were at first assumed to account for most of these cases. In recent years the pendulum has swung the other way. It would appear that these account for a comparatively small number of the many cases considered under this symptom complex. I have not satisfied myself that I have seen an undoubted case of sacro-iliac subluxation. It is, however, quite probable that this joint, along with other neighboring structures, is frequently subjected to strains from various causes.

It must not be overlooked that certain of these pains, generally bilateral, are distinctly neuritic in origin (spinal root) and associated with vertebral, cord and caudal lesions.

It is quite obvious, from what has been said, that our knowledge of this common disorder is anything but crystallized. That muscle dysfunction, with its tendency to involve successively related groups of muscles (kinetic units), plays an important part in the production of the clinical picture and its chronicity, appears at least plausible. Treatment based on the assumption of such dysfunction has resulted in some marked, and even spectacular, cures, and has given more or less relief to many. With a better understanding of the underlying causes of such muscular dysfunction we can hope to succeed oftener than we now do.

Many causes of this muscle dysfunction have been described, and, with some call on the imagination, many new causes may be suspected. I shall here mention some which to me have seemed to be definite factors in this type of cases.

1. Acute sprain of the lower back structures, especially of the lumbo-sacral joints; tears of muscle fibres or of portions of muscles; bruises of muscles or their periosteal attachment, or of bursæ, etc.

2. Chronic strains of the lower back structures due to postural abnormalities, occupational strains, static strains (flat foot, short leg, deformity in foot, ankle and knee). Abnormal gaits during recovery from disability in a lower extremity, etc., might properly be included under this heading, as productive of chronic strain.

3. Fatigue in the constitutionally weak, or in those recovering from wasting diseases or diseases exerting toxic effects on muscles, *i.e.*, hyperthyroidism, etc.

4. Acute infections in muscles (myositis) or their attachments, in joints, bursæ, etc.

5. Chronic inflammation of the vertebral articulations, muscles, fascia, etc., dependent often on foci of infection elsewhere. This, as a cause, probably accounts for many cases which show repeated or recurring attacks. Brackett has drawn attention to the special predisposition of individuals to chronic back complaints who harbor old, previously injured or diseased spines. In these individuals there is a tendency to chronicity far and above that found in normal individuals. It is conceivable that strains or pressure forces resulting from anatomical abnormalities may likewise initiate or maintain such dysfunctions or cause symptoms by direct pressure on nerves.

The proper examination of these chronic back invalids is a necessary prerequisite to proper treatment. They should be examined stripped, and the examination must be general and painstaking, otherwise much valuable information will be unavailable. A careful and searching history is no less indispensable. X-ray examination, preferably stereoscopic, of the spine and pelvis, and a neurological examination of the lower extremities, at least, should not be omitted in the serious cases. Occasionally, rectal examination will disclose much. Much stress is laid on the point of maximum tenderness on deep pressure as a guide to the location of the offending lesion. This, while an important aid, like many other isolated findings, is not pathognomonic. The importance of thorough examination lies in that it enables us to distinguish purely traumatic from infection processes, and to set aside cases due to a progressive disease. Failure to so distinguish properly may lead to harmful temporizing, and therapy productive of great damage to the patient.

As has been stated, some of these cases wear along and generally recover without or despite

treatment. With treatment, however, that is as intelligent as our knowledge (or imagination) will permit, one can hope to benefit and relieve many of these chronic sufferers.

Treatment.—I have seen the simple alteration of shoes by Thomas heels cause immediate relief from the symptom complex of low back strain with aggravated muscle spasm in back and thighs and characteristic pains. The same is true of cases in which the length of the lower limbs were equalized. Whenever static or postural abnormalities are noted in these patients, these abnormalities should be corrected as an aid to whatever other treatment may seem indicated. Occasionally a higher or lower heel will afford relief. Individuals with large pendant abdomens are made more comfortable with a suitable corset support.

In the chronically weak back with fatigue, due to muscle weakness from systemic causes, treatment should be directed to improvement of the general condition. Periods of rest during the day, coupled with some simple exercises and other physiotherapeutic measures are often helpful.

Rest in one form or another is an important ally in the treatment of many of these conditions. A firm bed will afford more rest to diseased or injured back structures than will a more yielding one. Plaster jackets, adhesive strapping, etc., afford forms of temporary rest which allow the patient to be about. A simple, narrow belt at times will produce freedom from symptoms, especially when placed low so as to grasp the gluteal muscles and so fix and support them. Metal braces and supports of the type of the Knight brace or some modification afford a more suitable partial support and fixation, for a longer period. In general, such fixation is indicated in the arthritic or seriously traumatized joints. An excellent means of securing rest and relief for severe spastically contracted and shortened muscles is recumbency on a firm bed with Buck's extension on both legs, with from fifteen to thirty pounds weight maintained continuously for from two to four weeks or longer if necessary. This often relieves pain and stretches shortened and contracted muscles, and, I believe, will, in selected cases, hasten improvement and recovery.

Application of various forms of heat, moist, dry, radiant or diathermia, relieves pain and softens muscles. Such treatment followed by an increas-

ingly vigorous massage of the affected muscles and tissues, preferably by a trained masseur, with special attention to painful and thickened areas, are useful therapeutic agents. Active and resistive exercises of obviously involved groups of muscles are likewise helpful.

These various agencies are directed mainly to muscles—to relieve their spasticity, to lengthen them, to favor their circulation and nutrition and to improve their strength and tone. Insofar as the muscles are the cause of the symptoms, one can hope for relief by these measures.

Some years ago I examined a large framed, muscular Serbian, who presented himself with typical history and symptoms of over a year's duration. I outlined for him a course of treatment and prescribed for him the belt which I fancied at that time. A year later he returned "just to shake hands" and to ask what I did to him, as he was cured before he got from my office to the street, and had remained well since, I admitted to him that I wished I knew. On several occasions I have had similar experiences and they are not generally considered unique. What happened? It is not probable that the man suddenly recovered from a vertebra which had been displaced for a year. I imagine rather that a slight adhesion had been broken or a contracted muscle lengthened by the manipulation incident to the examination. This has been aptly compared to an improvement in the going qualities of an old alarm clock after vigorous shaking. Forcibly stretching the posterior thigh and back structures—so-called straight leg raising—under general anesthesia, causes, at times, similar improvement, and is a definite aid in the treatment of carefully selected cases.

Individuals harboring definite or suspicious foci of infection should have them removed when possible. Even in an obviously traumatic case, such removal may terminate a chronic course.

I have had no experience with removal of vertebral transverse processes or arthrodesis of the sacro-iliac joint. As stated previously, many gratifying results by these surgical procedures have been reported in recent years. Because of the technical difficulties involved in excision of the fifth lumbar transverse process, and the present day difficulty in accurately differentiating the site and character of symptom-producing lesions, this operation has as yet only a limited field of application.

and should not be generally advocated. Some years ago I had occasion to employ a bone graft to fix the fifth lumbar vertebra in a case of beginning spondylolisthesis, as recently advocated by Whitman in certain cases of chronic low back pain. For the seven or eight months that the case was followed, the result was satisfactory.*

In conclusion I would emphasize the importance of careful examination and the consideration of all probable factors in these cases. In this manner only can the most intelligent treatment be applied to the individual case. Filling those patients with salicylates or hustling them to the diathermy room is not sufficient. It is especially important to recognize the arthritic group and above all the early stages of tuberculous disease of the vertebrae. Rough manipulation of these will only aggravate their sufferings, or lessen their chances of ultimate recovery. Cases which might probably be relieved by manipulations should be given the benefit of at least fair trial. It is in these latter cases that our chiropractic brethren occasionally "put it over." That they fail often, or aggravate many cases by their manipulations, does not affect the advertising that comes to them from the occasional cure.

*Since the above was written this man was again seen. In the six years that have elapsed since operative treatment he has remained well.

GOITER PROPHYLAXIS

Warnings against the promiscuous use of iodin in the prophylaxis of goiter are being sounded. Kimball urges that in all cases of iodin treatment, doses should be considered in terms of milligrams. The maximum dosage for an adult, provided there are no contraindications, is 10 mg. daily for not longer than one month, during which time the patient should be under very close observation. Kimball believes that there is no danger in the routine prophylaxis of goiter as it is carried out through the schools, namely, the administration of 10 mg. of iodin weekly. The evaluation of the use of iodin in hyperthyroidism belongs in a separate category. During the last few years its use has gained a new vogue. However, as now used, iodin has not been shown to be sufficient to suppress the disease permanently. (Jour. A. M. A., Dec. 19, 1925, p. 1970.)

COD LIVER OIL SUBSTITUTE

If an infant has rickets and an idiosyncrasy against cod liver oil, actinotherapy in the form of sun baths or ultraviolet ray exposure should be employed. Cod liver oil extract and irradiated foods have not yet been developed to a sufficient extent to be commercially obtainable in reliable form. (Jour. A. M. A., Dec. 19, 1925, p. 1986.)

MISTAKEN DIAGNOSES OF ACUTE APPENDICITIS*

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Probably the most useful papers for the advancement of medical sciences are: (1) those which have to do with original research work and (2) reports of large series of carefully worked out cases in which the results have been favorable. But for the men in general practice there is something to be learned by going back over the ground which has been covered and reviewing in particular some of the mistakes which have been made and which might have been avoided with a little more care. And so this paper will deal with the review of some cases in which mistakes were made in the diagnosis of acute appendicitis. I believe that the same errors are continually being made in general practice, and for the same reasons. The diagnosis of acute appendicitis seems fairly simple; yet with the advent of hospitals in the smaller places and the arrival of the modern doctor who can always remove an appendix, the number of unnecessary appendectomies is probably increasing. We are taught to get the appendix out before it ruptures and in our feverish anxiety to do so, no doubt we often get it out before it has become inflamed, and thereby overlook the real cause of the patient's trouble, which may not be surgical at all.

Case 1.—A few years ago, while an interne at a large private hospital in Minneapolis, I was called in the middle of the night to assist a well known doctor who had brought in a patient with the diagnosis of acute appendicitis. The patient was a young woman who had developed that day a pain in the abdomen, mostly on the right side, and pains in the back, vomiting, and a temperature of 103. A normal looking appendix was removed and for the next three days she continued to run an unexplained temperature of 103 to 104 and complained a great deal of backache. On the fourth day she broke out with smallpox. The high fever and the backache, if given equal consideration in diagnosis with the pain in the abdomen, would at least have prompted delay and operation might have been avoided.

Case 2.—A few months later, while an interne at a large charity hospital in Minneapolis, I assisted at an appendectomy done during the afternoon as an emergency by a prominent staff surgeon on a boy, aged 12, who had begun to complain a few hours before of pain in the lower right abdomen, vomiting and headache. A normal appendix was removed and twelve hours later the boy died of cere-

*Read before the Southern Minnesota Medical Association, Owatonna, Minn., May 18, 1925.

bro-spinal meningitis. The significance of the headache and vomiting was lost in the undue weight placed on the pain in the abdomen.

Case 3.—The patient, a married woman, aged 30, was seized with severe pain in the right lower abdomen, centering over McBurney's point, and when seen a few hours later had a temperature of 104 and was so tender over the lower right abdomen that she could hardly be touched. There was no complaint of pain in the back or of any bladder symptoms. There was no hospital in our town at that time and a snowstorm was in progress, so that trains were blocked. It seemed so certain that she had an acute appendix that under great difficulties we operated on her at home and took out a very small and very normal looking appendix. On the day after operation she began to complain of frequency and continued to run a high fever for several days. Microscopic examination of the urine, which had not been done before operation, revealed a large amount of pus. She recovered in a few days and has had several similar attacks since. She has since had a complete urological examination and a diagnosis of intermittent pyelitis was made. The high fever should have served as a warning and a microscopic examination of the urine might have saved the patient an operation and the doctors a lot of worry.

Case 4.—About eighteen months ago a female child, aged 7, was seen in consultation at the hospital at the request of the child's parents. She was about to be operated upon under ether anesthesia for acute appendicitis. She complained of pain over the lower right abdomen and was very tender to touch. Her temperature was 102 and she had a jerky little cough. Careful examination revealed slight dullness over the base of the right lung and we made a diagnosis of early lobar pneumonia, but could not definitely exclude an accompanying appendicitis. The parents elected immediate operation as long as there was any doubt, though it was explained to them that her trouble could all be due to a diaphragmatic pleurisy. The choice of anesthetic was changed to local and a normal looking appendix was removed. The child ran a normal course of pneumonia and recovered, apparently no worse for the operation. With definite findings in the chest, elicited by careful examination, it would certainly have been reasonable to wait, and an unnecessary operation, which fortunately was done under local rather than general, might have been avoided.

Case 5.—A middle-aged man suffered for several hours with severe pain in the lower right abdomen before calling a doctor. He vomited several times, had no urinary complaint or radiation of pain to the genitalia, was tender and rigid over the lower right abdomen; temperature was normal. At operation a small appendix was removed and it did not seem enough to account for his trouble. However, he made an excellent recovery, not again complaining of pain after awakening from the ether anesthesia. A few days later he had slight pains on one occasion while urinating and passed a small stone. It would seem probable that his pain in the first place was due to a ureteral stone which passed into the bladder while he was relaxed. Microscopic examination of the urine before operation might have revealed some blood cells, but none had been done.

Case 6.—Several months ago a young married woman was seen at the office because she had been told an hour before that she had acute appendicitis and must go into the hospital at once for operation. Her complaint was pain of moderate severity in the lower abdomen, especially on the right side, and nausea and vomiting for several days. According to her story, abdominal palpation had elicited slight tenderness over the appendix. No questions had been asked in regard to her periods. No pelvic examination had been made. Careful history revealed that the last period had been missed three weeks before and that the nausea and vomiting had come on soon after that. Examination revealed several presumptive evidences of pregnancy. She was not operated and seven months later delivered a normal baby. There has never been an attack of anything resembling appendicitis. No doubt many cases of early pregnancy are needlessly operated upon for appendicitis because a careful history and examination are omitted on account of undue prominence being given to the complaint of abdominal pain and vomiting.

Case 7.—A young woman, unmarried, had severe pain in the lower right quadrant for several days, had vomited three or four times, had a temperature of 99.6 when first seen and was very tender and rigid over the lower right abdomen. The attack was her first one and was not associated with her period. A diagnosis of acute appendicitis was made. Operation revealed an appendix that did not seem abnormal, but there was a small amount of serosanguineous fluid in the pelvis and examination of the ovary revealed a ruptured and bleeding cyst. No doubt this is a mistake which is frequently made and which perhaps at times is unavoidable.

Case 8.—A few months ago a farmer, aged 35, was seized with severe abdominal cramps about 4 p. m., while working in the field. When seen at 7 p. m. he was writhing with pain of a colicky nature centering in the lower right abdomen, vomited several times and was tender and rigid over the lower right rectus muscle. His temperature was 99. The urine was negative, an enema gave no relief and a diagnosis of acute appendicitis was made. At operation the appendix did not seem enough to account for his trouble, but nothing else was found except a rather dull bluish hue to the bowels. For one day he seemed better, then began again to have severe cramps and vomiting. This continued for three days, at which time the vomiting was assuming a fecal character, pulse was 180, temperature 100 to 101, abdomen tender all over and the patient rapidly getting worse. Under local an incision was made to the left of the midline, revealing the moderately distended bowel covered with a plastic exudate. A stab wound and tube low down in the pelvis on the left side drained off several ounces of sero-purulent fluid. An enterostomy was made by fastening a catheter into an easily available loop of small intestine. The patient did not vomit again, in a few days the catheter came out and the patient made an uninterrupted recovery. The day after the original operation he told what he had carefully avoided telling before—that he had taken a few drinks of moonshine that day and that the cramps had come on after that. The severity of the cramps and their colicky

nature was atypical of appendicitis and careful inquiry for the information which was not volunteered might have revealed the real trouble.

Two years ago I was called to see a young man who had been sick for ten days and was being treated by the family doctor for moonshine poisoning. He had been drinking moonshine at the onset of his trouble and had been seized with abdominal pains. When seen after ten days he was clammy and blue, pulse was thready and rapid, and abdomen was tender all over. At operation, which seemed almost useless, a general peritonitis was found. His appendix was involved, as was all the rest of the bowel, and while at the time we considered the peritonitis to be secondary to appendicitis, it has since occurred to me to wonder if it may not have been due to infection passing through the wall of the bowel highly irritated by the poisonous drink. In any case, in this day and age, moonshine must be considered in the differential diagnosis of acute abdominal conditions.

No doubt mistakes will be made even with the greatest of care, but hasty diagnosis is responsible for most of them. Probably no case is so urgent that it is not safer to take a little time to study it than to subject the patient to needless and sometimes actually harmful surgery. There is another factor which I believe is responsible for certain hurried diagnoses, especially in acute cases, and that has to do with the psychology of the patient's

family. We hear a great deal about the passing of the family doctor. If it is true that our modern system of education is rapidly eliminating that tried and trusted friend of the family so it is true that the trusting family is being eliminated and the doctor who sees an acute case now in the country and does not seem to know exactly what it is may find a new doctor on the case the next day. People like a definite diagnosis, even if it is wrong, hence the flourishing of the cultists, who always know exactly the seat of the trouble.

CONCLUSIONS

1. The number of mistaken diagnoses of acute appendicitis, resulting in needless operation, is probably large.
2. A patient with a temperature very much above normal should be studied carefully before being diagnosed as acute appendicitis. The higher the temperature, the more likely it is to be due to something else.
3. If a microscopic examination of the urinary sediment was done in every case, most of the kidney complaints which simulate acute appendicitis could be excluded.
4. Moonshine must be considered in the diagnosis, especially if the patient is a man and the pain is severe and colicky.
5. We should try to avoid being rushed into too hasty a diagnosis by the family's insistence on a name being placed on the patient's disease.

A year of construction work finds the vision of a great Medical Center in New York approaching realization. The general problems connected with the launching of such a project are in hand and building progress is satisfactory.

Ground was broken for the first unit of the Medical Center on January 31, 1925. This was the combined building which will house Presbyterian Hospital, Sloane Hospital for Women and the College of Physicians and Surgeons. It will cost upwards of \$10,000,000.

In spite of difficult excavation, the sub-surface formation being mostly limestone, the construction of this building has proceeded to the point where sixteen tiers of steel are in place for the twenty-two stories of the hospital part of the building. Two floors and part of a third will be utilized by Sloane Hospital.

Adjoining the Presbyterian-Sloane combined hospital is the Harkness Private Patient Pavilion, a \$1,500,000 structure donated by Mrs. Stephen V. Harkness and her son, Edward S. Harkness. Work on the Pavilion has proceeded rapidly and its outer shell is practically finished.

The medical college will have thirteen full stories and a tower. It will be connected with the hospital by an axis

of the same height. Steel has been erected for the first four floors where the Departments of Administration, Public Health, Physiology and Bio-Chemistry will be located.

Wide interest is being displayed in the New York State Psychiatric Institute and Hospital, which will be one of the institutions of the Center. It will be used by the State for research in the causes and treatment of mental disease. Plans drawn in the State Architect's office have been approved and specifications for bidding are being completed. Only cases of special scientific interest will be housed in the Psychiatric Institute, others being sent to the regular State Hospitals.

The Vanderbilt Clinic, now at Sixtieth Street and Tenth Avenue, will be a part of the Medical Center Out-patient Department, excavation for which has begun.

Sketch plans are being developed for the Neurological Institute, another hospital of the Medical Center. The Institute is now located on East Sixty-seventh Street. A building program is being developed for Babies' Hospital, which will also move to the Center.

It is expected that the institutions of the Medical Center will be in operation late next year.

THE THERAPEUTIC VALUE OF ROENTGEN RAYS*

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The increasing popularity of radiotherapy is causing many physicians to become interested in one or more of its different phases. Unfortunately, this interest too commonly takes the form of an order for a roentgen-ray machine, a small quantity of radium, or an ultraviolet lamp, and is based on little or no preliminary study of the principles underlying the therapeutic usefulness of these agencies, or of their indications and contraindications. Often unconscious of possible dangers, the new disciple proceeds to play with this new variety of fire with more or less unsatisfactory, not to say disastrous, consequences to his patients and sometimes to himself. In general, it would be far better for the physician to refer his patients to a competent specialist. I am aware that this is not always feasible. The physician may live at a distance from such a specialist and must perforce "carry on" as best he can. If I speak of this, it is because from time to time cases are brought to my notice in which a general practitioner has attempted to treat carcinoma of the uterus or some other disease with a portable bedside roentgen-ray unit, or with a fine-focus tube. Such instances are not nearly so rare as one might think. Of course, such attempts at treatment would be ludicrous if they were not so pitiful, and it is a question whether they should not constitute malpractice. Certainly they are an injustice to the patient.

Treatment by roentgen ray is one form of radiotherapy which has gradually assumed considerable importance in dealing with many diseases. In the time allotted to me I cannot hope to cover more than the general principles involved in the employment of such treatment.

The effect of roentgen rays on different tissues of the body varies within fairly wide limits. On the basis of their sensitiveness, tissues and structures may be graded, from the most sensitive to the least sensitive, about in this order: sex glands (testicle and ovary), blood and blood-forming organs (bone-marrow, spleen, lymph nodes), thymus,

skin, mucous membranes, fibrous connective tissue, muscle, bone, and nerve.

SEX GLANDS

The sex glands are very sensitive, even to moderate doses of roentgen rays. In the testicle the rays affect chiefly the spermatogonial cells and influence the whole process of spermatogenesis. Such effects vary naturally with the dosage, so that any degree of alteration may be produced. However, even with heavy doses, aspermatogenesis is not induced at once, because cells that have already reached an advanced stage of development, from the spermatocytes of the first order to the adult spermatozoa, are not so susceptible; the alterations produced become discernible only as the spermatogonial cells complete their cycle of evolution. In the ovary the rays act chiefly on the primordial follicles, the sequence of events being much the same as in the testicle. Given a dose of roentgen rays sufficient to destroy all the ovarian follicles, the artificial menopause so induced resembles in every respect the natural cessation of menstrual function, except that it is more rapid.

The action of roentgen rays on the sex glands is occasionally made use of therapeutically. When it is desired to sterilize an individual and the question of preserving internal secretion is not important, such sterilization may be readily accomplished by means of roentgen rays. However, if it is essential to maintain internal secretion, surgical intervention is preferable. In the hemorrhagic diseases frequently encountered in the female, roentgen rays can again be used to diminish ovarian activity and in certain cases to control symptoms, but this requires most careful adjustment of dosage. Because the ovaries of different women vary so much in functional activity, it is impossible in a given case to be certain of adjusting the dosage so nicely as to bring about the desired control of symptoms without producing complete cessation of function. Hence the use of roentgen rays in the treatment of such conditions should be limited to women who have reached, or are approaching, the natural menopause, and who no longer expect or care for children.

BLOOD AND BLOOD-FORMING ORGANS

The action of roentgen rays on the circulating blood consists of a primary leukocytosis bearing chiefly on the polynuclear cells and lasting from a few hours to two or three days, followed by a

*Section on Radium and Roentgen-ray Therapy, Mayo Clinic.

Read before the Northern Minnesota Medical Association, Brainerd, Minnesota, August 24-25, 1925.

steadily increasing leukopenia (destruction of lymphocytes), and after a time by more or less complete regeneration to the normal level. Regeneration occurs after small as well as after large doses, but the rate of regeneration varies according to the dose employed. On the normal spleen and lymph nodes the effect of the rays is limited chiefly to the destruction of lymphocytes and is not nearly so pronounced as when these structures are in a state of hyperplasia from any cause. Hyperplastic lymphatic aggregations are markedly susceptible to radiation, the lymphocytes being destroyed in large numbers and gradually replaced by connective tissue. Roentgen rays have little influence on erythrocytes except after heavy and repeated exposures.

These effects on the blood-forming organs are made use of in the treatment of certain diseases of the blood, spleen and lymph nodes. In leukemia the great capacity of roentgen rays to destroy lymphocytes and to produce leukopenia is valuable, because the leukocytosis manifested by this disease can thus be greatly reduced. In the myelogenous form the treatment is largely concentrated on the spleen, but, if this is not sufficient, the effect can be increased by treatment of the marrow of the long bones. In lymphatic leukemia the treatment is directed to the main groups of lymph nodes, whether superficial or deep, and also to the long bones, if necessary. At first such treatment is remarkably effective, but after it has been repeated a number of times its effectiveness gradually diminishes because of increasing fibrosis; finally the glands become quite resistant to the rays. However, patients with leukemia are often maintained in relatively good condition for several years. The effect of roentgen rays on the erythrocytes is utilized in the treatment of polycythemia. The rays must be relatively penetrating and the treatment continued several months before the erythrocytes can be notably reduced.

The use of roentgen rays in the treatment of hypertrophied tonsils and adenoids has been the subject of much controversy. In children and young adults, with tonsils made up largely of hyperplastic lymphoid cells, the glands can be readily diminished in size by exposure to roentgen rays. However, the rays have no direct effect on abscesses in or near the glands. In some cases the reduction of the gland, brought about by the destruction of the lymphoid cells by the rays, and the consequent

shrinkage of the organ, may be sufficient to squeeze out the contents of certain abscesses, but there is no certainty that this will happen. Hence, when the tonsils are infected, surgical excision is preferable. In adults, diseased tonsils are usually the seat of more or less scarring, and in many cases little lymphoid tissue is left. Consequently, roentgen rays cannot be expected to have much influence on such glands.

In cases of simple adenitis the cause should be sought and removed, but the hyperplastic lymph nodes can be more rapidly reduced to normal by exposure to roentgen rays. It has been found that, in whooping cough, as a result of the work of Leonard, Bowditch, and others, the mediastinal lymph nodes are usually much enlarged, and roentgenization of the mediastinum is often extremely useful in relieving symptoms; indeed, in some cases relief is remarkably rapid. In tuberculous adenitis, roentgen-ray treatment is effective, but it must be continued systematically for several months in most cases. The reaction of the glands is definitely slower when patients have been subjected previously to operation, probably because of scarring. It is generally better to aspirate pus from tuberculous abscesses in such nodes by means of a needle introduced, not through the thin fluctuating portion, but through the more normal surrounding tissue so as to prevent the formation of sinuses. Then the roentgen-ray treatment may be given systematically. It is well to give children general exposures to ultraviolet rays as well as roentgen-ray treatment.

THYMUS

An abnormally large thymus gland in infants is remarkably susceptible to roentgen rays; a gland covering a large portion of the thoracic field in a roentgenogram can be reduced to normal size after one or two exposures. In older children the effect is not nearly so striking.

SKIN

The effect of roentgen rays on the skin may be functional, organic, or specific, the organic effects being simply exaggerated functional effects due to heavier dosage. The functional effects consist of temporary epilation or inhibition of glandular secretions. The organic effects consist of permanent epilation, loss of glandular secretions and the destructive changes associated with an inflammatory reaction commonly known as radiodermatitis.

Radiodermatitis may be acute or chronic. In the acute form it varies in degree, but like ordinary burns it is generally classified in three degrees. First degree radiodermatitis, generally known as "erythema," consists, as the name implies, of redness followed by pigmentation and exfoliation. Second degree reaction goes through the same changes as the first degree but they are accompanied by vesiculation, superficial scarring, dryness, atrophy, and, after many months, telangiectasis. The third degree begins in much the same way, except that its different phases are more severe and, instead of returning to normal, the skin gradually becomes edematous and finally ulcerates over the exposed areas. Such ulceration resulting from a single exposure to a small area (no previous exposure ever having been made) will generally heal spontaneously within two or three months. However, if the area is large or if an overdose is given after many exposures, healing will be very slow and the ulcerated area will be very painful.

First and second degree radiodermatitis require no treatment beyond the application twice a day of Dodd's lotion.* Early third degree reaction should be treated in the same way, but when ulceration has taken place the problem is an entirely different one. The chief object is to combat infection so as to favor the early formation of epithelium. Old third degree radiodermatitis, involving soft parts which are flexible and over which the tissues are loose, may require excision and later plastic repair. However, before this is attempted, infection of the field should be carefully reduced by treatment with weak hydchlorite solution and by exposure to sunlight.¹

Roentgen rays have a specific action on the diseased cells in certain diseases of the skin. This is shown by the more or less rapid regression of such lesions with no effect on the surrounding normal skin. In some conditions this apparent specificity is really an indirect result of functional alteration.

*Formula of Dodd's lotion:

Phenol	1.85 gm.
Zinc oxid	15.50 gm.
Glycerin	4.00 gm.
Lime-water (quantum sufficit adde)....	250.00 c.c.

After the bottle has been thoroughly shaken, the lotion is poured over a wad of absorbent cotton until the latter begins to drip. This sponge should then be gently dabbed over the inflamed surface, and the lotion allowed to dry. The application should be repeated so that the entire area will be thoroughly covered with the lotion. The second coat should be dry before clothing is put on. This lotion should be applied night and morning for at least two weeks.

The use of roentgen rays in the treatment of skin diseases is generally based on the desire to utilize either the functional or the specific effects. In cases of ringworm, roentgen rays have no direct action on the parasite, but by causing a temporary epilation they remove the habitat and in this way give the skin an opportunity to recover.

In hypertrichosis the hair follicles are excessively developed and their functional activity consequently exaggerated. The destruction of such hyper-active follicles requires a roentgenologic dose which would be dangerous to the surrounding normal skin. Consequently, experienced radiologists usually refuse to undertake such treatment. Roentgen rays are useful in the treatment of hyperhidrosis, but treatment has to be given cautiously, and repeated many times to bring about the desired reduction in functional activity. The skin of different individuals varies in sensitiveness to roentgen rays. Thus the skin of a red-haired blond is much more sensitive than that of an absolute brunette. The variation may amount to between 10 and 15 per cent.

The specific action of roentgen rays on the pathologic cells in many skin diseases is constantly made use of. In acne vulgaris, roentgen-ray treatment combined with dermatologic surgery (drainage of infected areas) shortens the disease considerably. In acne rosacea the results are not so uniformly good; some cases are improved whereas others are more or less resistant. The subacute and chronic forms of eczema and eczematoid dermatitis generally respond well to roentgen-ray treatment. Certain cases of lichen planus improve and others do not. Small keloids are best treated with radium, but roentgen rays are preferable for large ones. The lesions respond very well and the skin can be thinned down to normal, such a result being purely a question of time. Warts and corns can be permanently removed by means of roentgen rays, although some require heavy doses and a few are quite resistant. Actinomycosis and blastomycosis, when superficial, are distinctly amenable to radiotherapy. Lesions deep in the body, however, whether in the intestines or lungs, are generally not affected and the prognosis in such cases is very bad.

In considering epithelioma of the skin the basal-cell form must be distinguished from the squamous-cell. The former is susceptible to roentgen-ray treatment, and more than 90 per cent of the

cases can be permanently cured. Squamous-cell epithelioma should be excised surgically and radiotherapy should be used in conjunction, preferably before, as well as after, operation.

ANALGESIC EFFECT OF ROENTGEN RAYS

That roentgen rays exert a truly analgesic effect in certain cases is not as well known as it should be, even by radiologists. And yet their pain-relieving qualities cannot be questioned by anyone who has tried them in suitable cases. However, to expect roentgen-ray treatment to stop pain of every description, whatever its cause, is unreasonable and can lead only to disappointment. The pain of early metastatic lesions in bones, such as those occurring in the spine following cancer of the breast, can often be abolished completely or for long periods. This is also true of the pain incident to chronic arthritis and in certain cases of neuralgia.

BENIGN AND MALIGNANT NEOPLASMS

In considering the sensitiveness of testicle and ovary to roentgen rays it has been pointed out that the more nearly embryonic the cell, the more susceptible it is to radiation, while the more adult, differentiated or specialized the cell, the greater its resistance. This is generally true and the cells characterizing various forms of neoplasm behave in exactly the same way. Tumors derived from structures highly susceptible to roentgen rays are themselves very sensitive to them. Thus malignant embryoma (also known as seminoma), which is a common variety of testicular neoplasm, is highly susceptible to roentgen-ray treatment, both in its primary and secondary manifestations.

Tumors of large size melt away in a short time. Indeed, this quick reaction can be made use of to distinguish such tumors from other varieties which are much less sensitive, such as true carcinoma or sarcoma of the testicle, and the relatively benign true teratoma. Since most ovarian tumors belong to the carcinoma or sarcoma group, the reaction is very similar to that of corresponding tumors in the testicle; that is to say, they are only moderately or slightly sensitive. In many tumors, correct roentgen-ray treatment frequently brings about considerable improvement. However, few permanent cures are obtained.

Malignant lymphoma.—Lymphosarcoma and Hodgkin's disease, being derived from lymph nodes, are also markedly affected by roentgen-ray

treatment. Many cases, even in fairly advanced stages, can be restored to normal for a period varying between several months and several years. The rapidity with which the enlarged nodes diminish in size is also characteristic, and is not approached by any other variety of malignant disease with which it might possibly be confounded.

Uterine fibromyoma.—The common beneficial effect of roentgen rays in cases of uterine fibromyoma is due partly to the influence of the rays on the ovaries and partly to a direct action on the cells of the tumors themselves. Since such treatment involves the production of an artificial menopause through destruction of the functional activity of the ovary, it should be restricted to women who are approaching the natural menopause and who present no urgent symptoms, such as excessive bleeding. If the tumor extends above the umbilicus, if the patient is still young enough and is anxious to have children, if there is evidence of calcification in the tumor, or if the bleeding is excessive and demands immediate control, operative treatment should by all means be considered.

Endothelioma.—This variety of neoplasm is relatively susceptible to roentgen-ray treatment and the primary lesion generally responds well.

Giant-cell tumors.—Giant-cell tumors are also satisfactorily treated by roentgen rays. From two to six weeks after a heavy dose of roentgen rays, the tumor undergoes a reaction accompanied by swelling which may give the observer an impression that the tumor is growing more rapidly. This is only a temporary phase of the reaction. A little later the swelling subsides, the tumor itself gradually disappears and bony regeneration takes place.

Carcinoma.—The sensitiveness of carcinoma depends on the organ in which it is situated. This variety of tumor is always much less sensitive than growths such as lymphosarcoma or testicular tumors; yet many of them can be greatly influenced and kept under control for considerable periods. Carcinoma of the thyroid gland is the most sensitive variety of carcinoma. Many of these cases do very well following thorough radiotherapy.

In cases of carcinoma of the cervix the best form of treatment is radium locally to and into the cervix, and roentgen-ray treatment from the outside. It is necessary thus to supplement the radium with roentgen-ray treatment, because the maximal effect of the radium is limited to a zone of approximately 2 cm. around the radium unit employed, the

outlying elements not receiving enough dosage to be of any consequence.

In cases of carcinoma of the breast it is sound practice to give a preliminary course of roentgen-ray treatment, after about six weeks to perform a radical operation, and to follow this by roentgen-ray treatment. However, circumstances may not permit such a procedure and it is then customary to give the roentgen-ray treatment only after operation. The old idea of repeating such treatment once a month for a long time after operation has been discarded, because, if the dose is adequate, from one to three courses should be sufficient; if it is not adequate, indefinite repetition would be useless. More time must elapse before conclusions can be drawn with regard to the final results from the roentgen-ray treatment of carcinoma of the breast.

Sarcoma.—The reaction of sarcoma is dependent on the rule that the more cellular the tumor the more sensitive it is to roentgen rays; therefore, the round-cell variety is the most sensitive and the osteosarcoma the most resistant. However, inasmuch as a highly cellular neoplasm is more active and metastasizes earlier than a less cellular one, it is common to see a splendid primary result defeated by metastasis to the lungs or elsewhere.

DOSAGE

It is beyond the scope of this paper to attempt to make a detailed statement of the dosage of the roentgen rays employed in treating such varied forms of disease as those mentioned here. I shall, therefore, limit myself to the more general factors involved in the selection of the dose required to deal with a given disease.

There is widespread confusion among physicians concerning this point, largely because of several misleading expressions which have obtained currency. One of these expressions is "deep therapy," which means absolutely nothing, because all roentgen-ray treatment is more or less deep, according to the quality of the rays employed. A beam of roentgen rays is made up of rays covering the entire scale of wave-lengths falling within a certain range of the spectrum. The proportionate selection from this range can be altered within certain limits by filtration, and again, by changing the voltage applied to the tube. Thus, when we have to deal with a disease of the skin, especially when not accompanied by much thickening of the integument, it is preferable to use rays of long wave-

length, otherwise known as soft rays, so as to have as large a proportion as possible absorbed at or near the surface. Consequently, we employ low voltage and no filtration; low voltage in this case meaning a voltage corresponding approximately to a 6-inch spark-gap, or, if measured by the sphere-gap method, one of about 80 peak kilovolts.

A great deal of care must be used in dealing with skin diseases. The treatment requires experience and a thorough knowledge of the capacities and limitations of one's apparatus, as well as accurate methods of measuring the different elements that enter into the dosage. Two chief methods of measuring dosage are in use; one largely employed by European radiologists and the other more commonly used in the United States. The first method involves the use of small discs or pastilles of barium platino-cyanide. Roentgen rays cause these pastilles to change color, and this color change can be compared to a standard furnished with the pastille outfit, and the dose thus determined. The method requires much practice and experience before one can become sufficiently expert and accurate. It has the disadvantage of bringing in a considerable personal variation in reading the changes in color.

The second method involves no special apparatus, but it does require test exposures on the skin of human beings under carefully controlled electrical conditions. From such tests a standard skin unit is established, and once this is accomplished it becomes a simple arithmetical problem to calculate any dose required. We owe this method to MacKee of New York, and any one who attempts to treat skin diseases by means of roentgen rays should by all means make himself thoroughly familiar with it.

Another radiologic expression often misleadingly employed is "the erythema dose." By itself this expression merely means the dose of roentgen rays that produces redness of the skin. Now, it is possible to produce such erythema with roentgen rays generated under a wide range of conditions; consequently the expression "erythema dose" has no meaning unless accompanied by a statement of the exact conditions under which such a dose was obtained. These conditions include the peak voltage, the filtration, the distance from the focus of the anti-cathode to the skin, the number of milliamperes of current passing through the tube, and the time of exposure.

If the disease to be treated is situated in the lymph nodes entirely beneath the skin, we employ somewhat harder rays so as to increase the proportion that will pass through the skin unabsorbed to reach the diseased structures. In such cases it is customary to employ rays generated at a voltage ranging between 100 and 140 peak kilovolts, measured by the sphere-gap method, or corresponding to a spark-gap of between 8 and 10 inches. When we are dealing with neoplasms deep within the trunk, and, especially, with the more highly malignant varieties of neoplasm, it becomes necessary to use the greatest possible proportion of the hardest roentgen rays available, and these can only be obtained at high voltage and with a thick filter. This statement constitutes a general rule of conduct to which there are some exceptions. Certain diseases, such as Hodgkin's disease and lympho-sarcoma, involving the lymphatic glands throughout the body, including those in the mediastinum and abdominal cavity, generally do not require so-called "high-voltage" treatment. Hyperplastic conditions of the lymph nodes are unusually susceptible to roentgen rays even at moderate voltages, and judicious treatment under such conditions is usually preferable to more radical procedures, because it tends to minimize the systemic reaction, which so commonly follows roentgen-ray treatment, and is tolerated better by the average patient. This is true even in the presence of large mediastinal and abdominal tumors of this nature. Much the same is true of the primary and secondary manifestations of malignant embryomas of the testicle. Now that we are recovering our senses following the craze which led many radiologists to treat everything with high-voltage roentgen rays, we are beginning to realize a little more clearly that to focus one's attention and efforts too sharply on the disease and to lose sight of its unfortunate victim is not sound medical practice.

Finally, I cannot emphasize too strongly the point that the ability to employ roentgen rays effectively as a method of treatment cannot be acquired by the mere purchase of a roentgen-ray machine, but requires as much special knowledge as any other special branch of medicine.

BIBLIOGRAPHY

1. Desjardins, A. U., and Smith, F. L.: Radiodermatitis and its treatment. New Orleans Med. and Surg. Jour., 1924, lxxvii, 177-183.

CALCIUM LACTATE AS A PREVENTIVE IN MIGRAINE

C. EUGENE RIGGS, M.D.

St. Paul

Some twelve years ago, I wrote a paper on ophthalmic migraine. By chance, a reprint, a few months ago, fell into the hands of a young woman employed at the State College of Washington, who suffered from this form of the disease. She wrote me asking if anything more had been learned since the writing of this paper, about the treatment of migraine. I advised the use of calcium lactate. Recently, I again heard from her; she wrote me as follows: "Calcium lactate works wonders with me; without it, I always counted on a full day of severe headache, following the appearance of the typical visual hallucinations, while now a dose of calcium lactate gives relief from practically all the nerve-racking pain and difficulties I used to have to expect as the usual thing. On several occasions I have made long drives in the car shortly after the beginning of the scintillations; before the use of calcium I would not have dared to have attempted this. I experience a double relief—that of the physical agony and that of the mental worry and dread incident to the attack. I carry it with me at all times; I never want to be without it."

Case 1. In Miss A., aged 27, the headache began when she was fifteen years of age; the attacks occurred at irregular intervals, usually every six or eight weeks. The pain, generally unilateral, was followed by nausea. Five or ten grains of phenacetin sometimes gave temporary relief; the headaches lasted from twelve to thirty-six hours. She retires perfectly well, to be awakened during the night by a severe headache. In an hour's time after taking 30 grains of calcium there is only a slight heaviness; an hour later this has disappeared. The attacks, since its use, are much milder and very much farther apart.

Case 2. Mrs. H. is forty-seven years old. She has suffered from migraine since her fourteenth year. The seizures occurred irregularly from once a week to once a year and lasted from ten to twelve hours. During the last two years, she has an attack before the menstrual period. Usually she is sleepless for several nights and she experiences a dull, achy feeling on rising. Pain generally is felt over the left eye; occasionally the pain is felt first over the right eye; it reaches its maximum in three or four hours. Vomiting then occurs but it affords no relief; the duration is from two to three days; of late the pain has greatly increased in severity. If given in time, calcium lactate arrests the seizure and there is no pain for several hours, after which it locates itself in the cheek-bones and over

CALCIUM LACTATE AS A PREVENTIVE IN MIGRAINE

the supraorbital notch—never on both sides of the face at the same time, but the next time the opposite side of the face is involved. The pain lasts three or four days; it may cease for several hours and then return—evidently a facial migraine. The facial migraine may occur independently of the hemi-craniial attacks. The entire face and forehead may be affected or the pain be localized to a small area. Calcium lactate does not relieve the facial type. Phenacetin and aspirin give no relief.

Case 3. Miss L., aged 30; developed migraine in her twenty-third year. The attacks occurred irregularly. The premonitory symptom—yawning—precedes the attack about eight hours. Pain over one or the other eye grows steadily worse, reaching its maximum in eight or ten hours. Then vomiting occurs; nausea is experienced in periodic waves, associated with a cold perspiration and a sensation of great weakness. Tongue and lips are dry; there is a feeling of feverishness. After the pain over the eye ceases, relief is experienced for some hours, there remaining a feeling of exhaustion, with an inability to take food. Pain then starts in the other eye, accompanied with nausea and vomiting as at the beginning of the seizure. If the alternation of pain from one eye to the other does not occur in the same day, several days may elapse before the second eye is attacked. If the calcium lactate is taken at the appearance of the yawning, the seizure is aborted. If, however, the calcium wards off the attack and there persists only a tired feeling, a recurrence of the headache is inevitable.

Case 4. Mrs. H., aged 45, is neuropathic to the nth degree. She has been unable to adjust herself to life's multiform relationships; compromises, constant and increasing, have racked and shattered her nervous system. An outstanding symptom has been pain in the head. Clearly to be differentiated from her various forms of headache was that of a typical migraine. Calcium lactate, if taken early, always relieved this, but failed to benefit her usual cephalgia.

Case 5. Mrs. E., a patient of many years' observation, is in the early fifties. She has suffered from migraine since girlhood. The attacks occur every four or six weeks. The pain is atrocious and the vomiting exhausting. They come on suddenly, accompanied by great nausea. She is unable to keep anything on her stomach—not even water. Only once has she retained calcium lactate, when relief was complete. The value of the drug in this case, because of this inability to take it, could not be determined.

Case 6. Mr. A., 50 years of age, has been subject to migraine since his youth. The attacks occur every two weeks, more frequently if subject to nervous strain. They begin in the evening; by morning the pain reaches its maximum and ceases at sundown. The first time he took calcium lactate the relief was immediate; if it is taken early, he states, the headache seems to be averted, but after three or four days it always returns; it would seem to defer but not prevent the seizure. This man discontinued the medicine because he fancied it increased the severity of the attack.

No single area of the brain can be held responsible for the symptoms manifested by this disease. The consideration of migraine as a vaso-motor neurosis, an anaphylactic phenomenon, or a protein poison is not germane to this report; also, it is the prevention not the treatment of the attack that concerns us chiefly. Therapy, unfortunately, is wholly empirical and most unsatisfactory. The long list of so-called remedies bear witness to this.

The late Dr. Byrom Bramwell prescribed phenacetin in heroic doses; he gave 30 grains of phenacetin when the first symptoms appeared. This was repeated the second or even the third time, at an hour's interval if required. Another sedative drug of merit is luminal in small doses, avoiding drowsiness, as advised by Wilfred Harris. Dr. Hurst believes that in migraine there is a constitutional tendency for the brain to become under certain conditions a storm center. Do these patients possess a peculiar inability to utilize calcium? Is this an explanation of the brain instability? It would seem from the remarkable benefit derived from the use of this drug that this is highly probable.

Prof. Henry C. Sherman of Columbia states that the ordinary diet of Americans in cities and towns is probably more deficient in calcium than in any other chemical element. The body contains normally about three pounds of calcium. There is a psychical factor in migraine that must be taken into account. Sir John Herschel found that he could induce an attack of migraine by picturing in his mind the visual phenomena which characterize an attack. Dr. Hurst reports that one of his patients would experience an attack by looking on a wall paper which had a zigzag pattern. Might not, he asks, the regularity of the every Sunday morning attack or those on the first day of the menstrual period be due to expectancy?

Calcium lactate is harmless; rarely irritates the stomach. Thirty grains should be given immediately at the first warning of an approaching attack. The tablets should always be kept on hand and they should be fresh. Age renders it inert. Calcium lactate does not cure migraine but in a majority of cases it prevents the attack and in certain instances the seizures become much milder and the interval between them is greatly prolonged—in fact, so inconsequential do they become that the patient pays no further attention to them.

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MINNESOTA MEDICINE

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EDITORIAL

Asexualization

An article by Dr. J. H. James, "Asexualization—A Remedy for Crime and Criminality," in this issue of MINNESOTA MEDICINE raises some very interesting questions.

Before any adequate plan for dealing with crime and criminals can be devised, it is necessary to study the physical and psychological make-up of criminals and to decide just what is meant by crime. A criminal may be a man who rapes a woman, who holds up a bank, who kills his daughter's betrayer, who sells whiskey, or who forges a check. He may be super-intelligent, of average intelligence, or feeble-minded, epileptic or suffering from dementia precox. Crime is such an inclusive term that it may mean anything. It is obvious that the word "crime" is as extensive as the word "sickness." Sickness must, of course, be analyzed into various diseases before it can be dealt with, and in the same way crime must be analyzed into its various aspects before it can be dealt with.

It may be supposed, however, that those that advocate asexualization of criminals would apply their treatment only to habitual criminals who commit serious offenses. Many surveys, especially those made by the National Committee for Mental Hygiene, have shown that a large percentage of habitual criminals are suffering from a mental disease or mental defect. The problem then largely is: Shall people suffering from mental defect or mental disease be made sterile? In the case of feeble-mindedness, it is not at all proved that mental defect is inherited in the way that has been claimed.

Dr. Abraham Myerson in his book, "The Inheritance of Mental Disease," feels that much of the work on feeble-mindedness has been uncritical and inadequate. He utterly disbelieves that "mental deficiency is a menace to the world because it is strongly hereditary and because the feeble-minded are prolific beyond the normal." He is of the opinion that those cases of feeble-mindedness which are actually familial originate in reality from an injury to the germ plasm from without. In discussing the psychoses, Dr. Myerson does not believe that psychoses are inherited in any such fatalistic way as claimed by some biologists.

H. S. Jennings, a leading biologist, goes so far as to say that "man is characterized by the possession of many sets of inherited characteristics, the decision as to which shall be produced depending on the environment." Jennings goes on to point out that the behavior of every human being always depends on two factors—hereditary tendencies modified by environment.

If this is true, and most modern biologists hold this view at the present time, anti-social behavior, which we call criminality, is due as much to the environment as to heredity. We venture to say that Gerald Chapman may have had children who, if reared under the proper environment, might be just as intelligent and just as useful to society as the children of a banker or college professor.

It is our feeling that it would be unwise in our present state of knowledge for physicians to advocate laws for the sterilization of habitual criminals. More study is needed. There is very little evidence at the present time that such laws would benefit society in helping to rid itself of the professional criminals.

SMILEY BLANTON, M.D.,
Child Guidance Clinic, Minneapolis.

Superannuated Physicians

Throughout the United States there are doubtless many aged physicians who are incapacitated and in want as a result of the infirmities of old age. There are without question many widows and children of departed members of the profession who need material assistance.

In an effort to meet this need the Physicians' Home, Inc., was organized several years ago in New York state. A farm in New York state was donated to the organization to serve as a home for aged and dependent doctors and from last reports four doctors had availed themselves of the opportunity offered.

Recently steps have been taken to raise a fund to further the work of the organization. It is the plan, if sufficient funds are raised, to establish homes similar to the one in New York in various parts of the United States. No avowed campaign is being launched but physicians all over the country are being requested to lend their names in support of the undertaking and efforts are being made to raise a substantial sum.

At the San Francisco meeting of the American Medical Association in 1923 a resolution of the House of Delegates was passed expressing approval of the undertaking. The names of some prominent members of the profession have become associated with this project, and the officers, headed by Dr. Roger T. Morris, who seems to be the leading spirit, assure the reliability of the venture.

Nevertheless, it does seem as though it would be well for the same organization or possibly the American Medical Association to make a national survey of the situation to determine, first, how great a need exists, and, second, whether in case a number of homes are provided throughout the country it is likely that they will be patronized. Four physicians in New York state taking advantage of the home already established is not a convincing argument that homes of this sort are likely to solve the problem.

Somewhat over a year ago we called the attention of our readers to the desirability of establishing a fund for the relief of superannuated members of our State Association and their dependents. The question has come before the Council of our Association on several occasions. Unfortunately, the State Association has never been so overburdened

with wealth that it could set aside any suitable sum for this purpose.

We are still of the opinion that each state can best handle its own problems of this sort. It would be a relatively simple matter for our House of Delegates to authorize the Council to set aside a separate fund for this purpose. Here would be a worthy object for bequests on the part of our wealthy members. A beginning having once been made it is quite possible that in time a very substantial endowment might easily be established. We recommend a consideration of this subject to the House of Delegates when it meets in May.

The County Society

The county medical society attains an end which is not reached by the state or national association.

The writer used to belong to a medical society which at its regular meetings would get out the card tables and play whist, and where any kind of a paper was looked upon as an anomaly. Now, the local society sacrifices to the social deity with a banquet.

Much good accrues apart from scientific gains in county society meetings. One observes that his confrere is not as black as rumor and distance have indicated. At the banquet he ingests—late at night—quite as largely as anyone, and, indeed, seems, strangely enough, quite human and probably not after all merely a cold-blooded money-maker.

Before or after the dinner the older practitioner listens to the paper of the younger man who has not forgotten the case reports of his internship with its wealth of laboratory detail. The younger man praises—let us hope not ironically—the large experience of the other.

The state and national associations did well in making membership in the county society a prerequisite to membership in the larger bodies.

One notices, too, that—in some parts of Minnesota at least—the average membership is not growing older eleven months a year, as we are assured it is in the country districts at large. A proportion of the younger men are to be found in the country and are not immediately becoming what Eugene Murphrey calls gimlet-eyed young specialists in the cities.

H. B. A.

COMMUNICATIONS

To the Editor:

As per your request, I am submitting briefly misinterpretations of the Narcotic Law, made by physicians, as found by Narcotic Agents and Inspectors.

Special Tax Stamp.—Seldom does he have his Tax Stamp posted in a conspicuous place.

Inventories.—The affidavits made at the time of payment of the Taxes are misplaced.

The Order Forms.—Original Forms missing, duplicate forms blank, failing to insert the date on the form, and failing to keep duplicate orders on file two years ready for inspection.

Records.—Physicians must keep separate records to account for drugs purchased, showing date, name and address of patient, kind and quantity of drugs dispensed, the only exception being drugs personally administered by the physician to his patient away from his office. See Art. No. 126, Reg. No. 35.

Prescriptions.—Are for patients *only*, not for "self" or "Office Use." Must be written with ink or indelible pencil, or typewritten, then must be signed with ink or indelible pencil. Prescriptions must bear the following information: Date; Name and Address of Patient; Name, Address and Registry Number of Physician. Where certain patients are receiving narcotic prescriptions regularly, the physician must show on each prescription the purpose it is intended for. See Art. 117, Reg. No. 35.

Refill Prescriptions.—The refilling of a narcotic prescription is prohibited, therefore a physician's order "Refill Rx. No. —," cannot lawfully be filled by a druggist. See Art. 120, Reg. No. 35.

Telephone Instructions.—A druggist cannot send out medicines containing narcotics pursuant to telephone advice of physicians. See Art. 121, Reg. No. 35.

Last, but not least, the Narcotic Agents and Inspectors are their friends and anxious to oblige and advise. Physicians should not feel that the Agents are trying to molest or get something on them.

A perusal of the above, Doctor, will show you how easy it is to comply with the Narcotic Law and Regulations.

Respectfully,

JOHN HESSE,

Narcotic Inspector.

H. H. WOUTERS,

Narcotic Agent in Charge.

To the Editor:

In a bulletin of the Treasury Department this day received at our office, a decision was handed down to the effect that legal expenses incurred by a doctor in the defense of a civil suit for malpractice are allowable deductions as business expenses; while expenses incurred in a criminal action brought against the doctor for instance for violating the narcotic law would not be deductible.

Very truly yours,

OPPENHEIMER, DICKSON, HODGSON, BROWN &
DONNELLY.

By W. H. OPPENHEIMER.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

INTER-STATE POST GRADUATE FOREIGN CLINIC ASSEMBLIES

1926

The 1926 foreign clinic assemblies given under the direction of the Inter-State Post Graduate Assembly of North America will cover a territory including the chief clinic cities of Italy, Switzerland, Germany, Austria, Czechoslovakia, Holland and Belgium.

The physicians are going abroad as the result of invitations extended, through this Association, by the leading medical universities and institutions of the countries to be visited to the medical profession of North America.

The members of the party will sail from New York on April 28, a few days after the meeting of the American Medical Association at Dallas, Texas, thus giving the physicians of the party plenty of time to attend this meeting.

The large first-class cruising steamer, the "Araguaya," of the Royal Mail Steam Packet Line, has been chartered to take the physicians abroad. The party will land at Cherbourg and will go at once to Paris, where the clinic assemblies start.

Dr. Carl Beck of Chicago, the General Secretary for the foreign assemblies, is now in Europe completing the clinic arrangements for the assemblies. The clinic cities to be visited are as follows: Paris, Rome, Florence, Padua, Milan, Berne, Zurich, Munich, Vienna, Prague, Berlin, Amsterdam, The Hague, Utrecht, Leyden and Brussels. There will be extension assemblies held in all other principal medical centers of Europe following the main assemblies.

It is of interest to note that a large percentage of the distinguished teachers, who will instruct the assemblies, speak the English language. However, there will be a director chosen from the teaching staff in each of the clinics, who will be able to speak good English in case the chiefs do not. It will be the duty of this director to present the history cases and to answer questions as an interpreter. This is one of the reasons why Dr. Beck is now in Europe.

The assemblies are open to members of the profession who are in good standing in their State or Provincial Society with no restriction to territory. This invitation is understood to be extended to the entire medical profession of North America.

Admittance to the clinics and privileges of the tour will be protected by the issuing of an admittance ticket or card. This rule will be strictly enforced in order to protect the Association in its membership requirements, which is, that a physician must be in good standing in his State or Provincial Society. We will not be responsible or admit physicians to privileges unless they are members of the group.

The members of the party will be limited to a number that can be accommodated comfortably in both the clinics and hotels. After careful consideration and consultation with the transportation department and the foreign clinics,

this number has been fixed at five hundred, which includes members of the physicians' families. Necessarily, this will limit the number of physicians to around three hundred.

Physicians may return home on three separate sailings during the main assemblies. First, at the end of the visit to Italy and Switzerland by way of Cherbourg; second, at the end of the visit to Holland from Rotterdam, and third, at the end of the assembly in Brussels from the port of Antwerp.

It is necessary in order to hold space for the assemblies to send to the office of the Managing Director, W. B. Peck, Freeport, Illinois, the sum of \$65 per person. If for any reason the applicant for space decides that he cannot attend the assemblies, the money will be refunded immediately, if this demand is made as early as six weeks before sailing time. A booklet of information pertaining to the assemblies and prices for same may be secured free of charge by writing the Managing Director's office.

Ladies' Entertainment: Besides the extensive sightseeing and travel features, arrangements are being made for a ladies' entertainment committee in each of the clinic cities. The committees will be composed of the wives of the clinicians and prominent citizens.

In offering the foreign clinic assemblies this Association has the hearty co-operation and assistance of the most distinguished teachers and clinicians in both North America and Europe. The organization in its endeavors hopes to combine with its success in post-graduate work a corresponding advancement in International goodfellowship among the members of the medical profession of the different countries of the world.

The officers of the assemblies are:

Dr. Charles H. Mayo, Chief Executive and General Chairman, Rochester, Minnesota.

Dr. Carl Beck, General Secretary, Chicago, Illinois.

Dr. William B. Peck, Managing Director, Freeport, Illinois.

Mr. Reeve Chipman, Manager of Transportation, Boston, Mass.

A second section of the assemblies for a limited number will be conducted during the summer months for those who are unable to take advantage of the April sailing. The members of the party will leave New York, S.S. "Pittsburgh," on June 19, return sailing, August 13, from Antwerp, S.S. "Zeeland."

MINNESOTA STATE MEDICAL ASSOCIATION

Owing to the fact that the American Surgical Association will meet the week of May 24, it has been decided to change the date of the meeting of the Minnesota State Medical Association to May 17, 18 and 19, 1926.

AMERICAN BOARD OF OTOLARYNGOLOGY

An examination will be held by the American Board of Otolaryngology in Dallas, Texas, on Monday, April 19, 1926, and in San Francisco, California, on Tuesday, April 27, 1926.

Application should be made to the Secretary, Dr. H. W. Loeb, 1402 South Grand Boulevard, St. Louis, Missouri.

CONGRESS ON INTERNAL MEDICINE

The Tenth Annual Congress on Internal Medicine will be held at Detroit and Ann Arbor, week of February 22-27, 1926.

The Congress is devoted to amphitheatre, bedside and clinical laboratory demonstrations as well as to symposia dealing with modern phases of internal medicine. Distinguished guests from abroad, Canada and the leading clinics of the United States will occupy prominent places on the program. Four days will be devoted to the work at Detroit and on one day the society will be the guest of the University of Michigan at the newly opened eleven-hundred-bed University Hospital.

All physicians who are interested in internal medicine and who are members in good standing at their local and national societies are cordially invited to attend the Congress.

Hotel headquarters will be at the Book-Cadillac in Detroit. Information regarding reduced railroad rates, program, hotel accommodations, etc., may be secured from the Secretary-General.

C. G. JENNINGS, M.D., President,
American Congress on Internal Medicine,

Detroit, Mich.

FRANK SMITHIES, M.D., Sec'y-Gen'l,
920 N. Michigan Avenue.
Chicago, Ill.

PARK REGION DISTRICT MEDICAL SOCIETY

The Park Region District Medical Society met January 13 at Fergus Falls. A very interesting program and entertainment was presented to the attending physicians and their wives.

The following papers were presented:

1. Headaches. Dr. T. S. Paulson, Fergus Falls.
 2. Malarial Treatment of Paresis. Dr. W. L. Patterson, Fergus Falls.
 3. Case Reports. Dr. W. L. Burnap, Fergus Falls.
- A reception for the ladies was held at the residence of Dr. and Mrs. Burnap, at which time an auxiliary of the association was organized. Mrs. A. C. Baker of Fergus Falls was chosen President; Mrs. P. Boysen of Pelican Rapids, Vice President; Mrs. W. L. Patterson of Fergus Falls, Secretary, and Mrs. W. A. Wray of Campbell, Treasurer.

After a banquet, held at the Kaddatz Hotel, Dr. Hilding Berglund, University of Minnesota, discussed some recent advances in diagnosis of the gallbladder.

Dr. E. A. Meyerding, secretary of the Minnesota State Medical Association, discussed state medical economic problems and Dr. H. M. Johnson, president of the State Association, outlined plans for the future.

A resolution was passed instructing the delegates to the next state meeting, May 17-18-19, in St. Paul, to vote for an increase of dues to \$15 per annum.

The officers of the society are: Dr. P. G. Cowing, Evansville, President; Dr. A. J. Lewis, Henning, Vice President; Dr. Theo. Satersmoen, Pelican Rapids, Secretary-Treasurer.

RICE COUNTY MEDICAL SOCIETY

The annual meeting of the Rice County Medical Society was held at Faribault, Minn., Dec. 18, 1925. Election of officers resulted as follows:

President—Dr. Joseph Moses, Jr., Northfield

First Vice President—Dr. S. B. Haessly, Faribault

Second Vice President—Dr. W. B. Lee, Northfield

Secretary-Treasurer—Dr. Carl A. Traeger, Northfield

Censor—Dr. P. A. Smith, Faribault

Delegate—Dr. F. S. Warren, Faribault

Alternate Delegate—Dr. D. E. McBroom, Faribault

A very unusual, but very practical and helpful program was given. Through the courtesy of the Minnesota Industrial Commission, Mr. Hugo, compensation adjuster for the Commission, gave a thorough discussion of the "Workman's Compensation Law." A general discussion followed. Those members present felt this was an excellent way of becoming more familiar with our State Commission and those who administer it. It was recommended that other societies have a similar program.

OF GENERAL INTEREST

Dr. W. S. Nickerson, formerly of Lonsdale, Minnesota, has taken over the practice of Dr. W. N. Theissen (deceased) at Faribault.

Dr. Frederick Foley and Dr. Philip F. Donohue, St. Paul, will open offices in the near future for the practice of genito-urinary surgery.

The membership of the Minnesota State Medical Association has gone over the 2,000 mark. The registration early in January had reached 2,007.

Dr. P. F. Meyer, formerly of Belle Plaine, has located at Faribault. Dr. and Mrs. Meyer are receiving congratulations on the birth of a baby daughter.

Wm. F. Wittig and Mathilde C. Andresen, chiropractors, of Red Wing were sentenced in November to thirty days in the Goodhue County jail and fined \$50 each for practicing without a license. No appeal was taken.

Dr. Harold E. Richardson, St. Paul, formerly associated with Dr. Charles Lyman Greene, announces his association with the St. Paul Clinic. He will limit his practice to cardio-renal disease, including electrocardiography.

Attention is called to an error which occurred in the last number of MINNESOTA MEDICINE. It was stated that Dr. Isaac Abt had been appointed assistant to the staff of St. Luke's Hospital, St. Paul. The reference should have been to St. Luke's Hospital in Chicago.

A very practical book on head injuries has recently been published by the Gorham Press entitled "Practical Helps in the Study and Treatment of Head Injuries," by Dr. Adolph M. Hanson, Faribault, Minn., formerly neurosurgeon to Evacuation Hospital No. 8, American Expeditionary Forces.

The regular monthly meeting of the medical staff of Bethesda Hospital was held December 28 with an attendance of twenty-six members. A paper was read by Dr.

V. N. Petersen on the "Prostate Gland," which was followed by a general discussion and reports of cases of general interest. Dr. K. C. Wold presided.

The Annual Congress on Medical Education, Medical Licensure and Hospitals will convene in the Gold Room of the Congress Hotel, Chicago, February 15, 16, 17 and 18, 1926. An interesting program has been planned and an invitation is cordially extended to members of the profession to be present and take part in the discussions of the various papers.

Dr. M. Seham of Minneapolis was selected to make the annual address before the New England Pediatric Society in Boston on January 11. He chose the subject of "Chronic Fatigue in School Children," and reported the results of his and Dr. Grete Scham's researches and observations. While in the East, Dr. Seham was also invited to address the Pediatric Section of the New York Academy of Medicine on the same subject.

An innovation which might well be copied in other cities occurred in Albert Lea when physicians of the town furnished the program at the January meeting of the local Business Men's League. After the preliminary business of the league was transacted, Dr. J. P. von Berg took the chair as toastmaster and the local physicians furnished a program which included historical, public health and progressive phases of the practice of medicine. Such lay meetings serve to acquaint the laity with the facts regarding the practice of the healing art and the general adoption of proceedings of this sort should be of benefit to both the laity and the profession.

In a recent bulletin the secretary of the State Association expresses the desire to be of assistance to the component county societies. The secretary is eager to arrange for the attendance of a state officer at the various county meetings. This arrangement is most desirable in further cementing the relations between county and state organizations.

The county society seldom avails itself of the opportunity to obtain information about new members from the office of the secretary of the American Medical Association. County society records should have as complete information regarding its members as possible.

The Board of Governors of the Mayo Clinic has established the J. William White Scholarship. This scholarship has been made possible by reason of a legacy left to Dr. W. J. Mayo and Dr. C. H. Mayo by the late Dr. White, formerly Professor of Surgery at the University of Pennsylvania.

It was Dr. White's desire that the proceeds from this gift should be used for educational purposes in the Mayo Foundation. In accordance with this wish the Board of Governors has decided that a scholarship should be created, the scholarship to be awarded by the Trustees of the Mayo Properties Association, on the recommendation of the Medical Graduate Committee of the Mayo Foundation, to the graduate (either M.S. or Ph.D. in Surgery in the Mayo Foundation) who, in the opinion of the Committee, is most deserving of an opportunity for study in surgical clinics in foreign countries.

NEW AND NON-OFFICIAL REMEDIES

COUNCIL ON PHARMACY AND CHEMISTRY

The following articles have been accepted:

ARLINGTON CHEMICAL COMPANY:

Pollen Extracts

CUTTER LABORATORY:

Pollen Extracts

Special Pertussis Vaccine-Cutter

ELI LILLY & CO.:

Coco-Quinine

MALLINCKRODT CHEMICAL WORKS:

Sulpharsphenamine-Mallinckrodt 0.1, 0.2, 0.3, 0.4, 0.5,
0.6 Gm. Ampules

H. K. MULFORD CO.:

Insulin-Mulford 10, 20, 40, 80 Units 10 c.c.

PARKE, DAVIS & CO.:

Pollen Protein Extracts Diagnostic-P. D. & Co.

Protein Extracts Diagnostic-P. D. & Co. Group 28;

Protein Extracts Diagnostic-P. D. & Co. Group 29;

Protein Extracts Diagnostic-P. D. & Co. Group 30;

Protein Extracts Diagnostic-P. D. & Co. Group 31.

PHYSICIANS DIAGNOSTIC LABORATORIES:

Concentrated Culture Bacillus Acidophilus-P. D. L.

SWAN-MYERS COMPANY:

Mixed Ragweed Concentrated Pollen Extract-Swan-
Myers

E. R. SQUIBB & SONS:

Scarlet Fever Streptococcus Antitoxin Concentrated

Scarlet Fever Streptococcus Toxin for Dick Test-Squibb

Scarlet Fever Streptococcus Toxin-Squibb

TRUTH ABOUT MEDICINES

Boro-Chloreton.—A dusting powder composed of chloreton (New and Non-official Remedies, 1925, p. 91), 1 part; boric acid, 1 part; purified talc, 2 parts. Parke, Davis & Co., Detroit.

Powdered Whole Lactic Acid Milk-Merrell-Soule.—A modified milk preparation prepared from whole milk soured by the action of a culture of *Bacillus bulgaricus*. Each 100 gm. contains approximately butter-fat, 28 gm.; protein, 26 gm.; lactose, 33 gm.; free lactic acid, 4 gm.; ash, 6 gm.; moisture, 3 gm. When suitably mixed with water, powdered whole lactic acid milk-Merrell-Soule is said to be useful in the feeding of infants when a soured milk is indicated. Merrell-Soule Co., Syracuse, N. Y. (Jour. A. M. A., Dec. 5, 1925, p. 1811.)

Ovarian Substance Desiccated-P. D. & Co.—The entire fresh ovary (including the corpora lutea) of the hog and cow, dried in vacuo and powdered. For a discussion of the actions and uses, see Ovary, New and Non-official Remedies, 1925, p. 251. The product is also marketed in the form of five-grain tablets. Parke, Davis & Co., Detroit.

Ovarian Residue Desiccated-P. D. & Co.—The residue from the fresh ovary of the hog or cow after the removal of the corpora lutea, dried and powdered. Ovarian residue is used for the same conditions as those in which the entire ovarian substance is used. The product is also mar-

keted in the form of capsules and tablets containing five grains. Parke, Davis & Co., Detroit.

Insulin-Mulford, 10 Units, 10 c.c.—Each c.c. contains ten units of insulin-Mulford (Jour. A. M. A., June 20, 1925, p. 1917). H. K. Mulford Co., Philadelphia.

Insulin-Mulford, 20 Units, 10 c.c.—Each c.c. contains twenty units of insulin-Mulford (Jour. A. M. A., June 20, 1925, p. 1917). H. K. Mulford Co., Philadelphia.

Insulin-Mulford, 40 Units, 10 c.c.—Each c.c. contains forty units of insulin-Mulford (Jour. A. M. A., June 20, 1925, p. 1917). H. K. Mulford Co., Philadelphia.

Insulin-Mulford, 80 Units, 10 c.c.—Each c.c. contains eighty units of insulin-Mulford (Jour. A. M. A., June 20, 1925, p. 1917). H. K. Mulford Co., Philadelphia.

Ampules Dextrose 50 Per Cent, 20 c.c.—Each ampule contains 20 c.c. of a 50 per cent solution of dextrose U.S.P. Swan-Myers Co., Indianapolis. (Jour. A. M. A., Dec. 12, 1925, p. 1891.)

PROPAGANDA FOR REFORM

Examination of Brands of Cinchophen.—Cinchophen was introduced in the U. S. under the proprietary name "Atophan" by Schering & Glatz. At one time "Atophan" was included in New and Non-official Remedies. It was omitted 1921 because unwarranted therapeutic claims were made for it and for other reasons. As a result of the war, cinchophen was manufactured in the U. S. and at that time the A. M. A. Chemical Laboratory examined the market supply and found this satisfactory. Now the Laboratory reports the results of a re-examination. The Laboratory found that the cinchophen now marketed is still purer than that examined before and that all brands complied essentially with the standards of the new U. S. Pharmacopoeia. It is concluded that all the products reported on (cinchophen-Abbott, cinchophen-B.P.C., cinchophen-Calco, cinchophen-M.C.W., cinchophen-Morgenstern and Atophan) are equally good for therapeutic purposes, and one is no better than another. The report of the Laboratory brings out the exorbitant price that the public and the profession have to pay for proprietorship in medicine. Under its non-proprietary name, cinchophen can be purchased for from fifty cents to one dollar per ounce; but "Atophan" costs from \$2.50 to \$2.75 for the same amount. (Jour. A. M. A., Dec. 5, 1925, p. 1828.)

More Misbranded Nostrums.—The following products have been the subject of prosecution by the authorities charged with the enforcement of the Federal Food and Drugs Act: Gary's Vegetable Ointment (The Sloan and Spencer Medicine Co., Birmingham, Ala.), consisting mainly of kerosene, alcohol, turpentine, camphor and menthol. Sayman's Wonder Herbs (T. M. Sayman Products Co., St. Louis, Mo.), consisting essentially of a mixture of baking soda, powdered ginger, gentian root, rhubarb, licorice, cascara sagrada, buchu, senna, mandrake and buckthorn. Chappelar's Bronchini (Wm. M. Chappelar & Sons Co., Zanesville, O.), consisting of ammonium chlorid, extracts of plant drugs, flavoring material including anise and sassafras oil, sugar, alcohol and water. S-K Remedy (S-K Remedy Co., Oakland, Oregon), composed essentially of vegetable drugs, including aloes and a small quantity of a mydriatic alkaloid, alcohol and water. (Jour. A. M. A., Dec. 12, 1925, p. 1907.)

CASE REPORTS

Members are requested to report interesting and unusual cases for publication in this department. Many cases reported at hospital staff meetings and similar meetings are very instructive and worthy of publication.

EXPECTANT TREATMENT OF FOREIGN BODIES IN THE STOMACH*

HERMAN J. MOERSCH, M.D., and PORTER P. VINSON, M.D.
Rochester, Minnesota

Many persons, some of them physicians, believe that a foreign body in the stomach, esophagus or air passages demands immediate removal. While in certain instances this may be true, in the majority of cases no such emergency exists.

Even the most experienced endoscopist encounters great difficulties at times in extracting foreign bodies from the esophagus under the most favorable circumstances and with the aid of complete equipment. His difficulties are often increased by previous abortive attempts made by physicians who have little skill in the work and no more adequate equipment than a stomach-tube and forceps.

that may be experienced as the result of inadequate equipment for all emergencies.

Case 1: A child, aged eighteen months, was admitted to the clinic May 24, 1925. May 21 the child had swallowed an open safety-pin. The home physician was called and he attempted without success to remove it by means of his fingers and a pair of forceps. Two days later esophagoscopy was attempted and the pin was seen high in the gullet. In the endeavor to extract the pin it was pushed farther down the esophagus and all attempts had to be given up because of lack of proper instruments. The following day the child was brought to the clinic. The temperature was 104° by rectum and the pulse rate 160. She did not look as if she would live through the day. A roentgenogram, taken immediately, showed the pin in the esophagus above the cardia (Fig. 1). Esophagoscopic examination was attempted, but on account of the marked injury of the mouth and gullet which had resulted from previous instrumentation and the great danger of perforation through the ulcerated walls, it was deemed inadvisable to continue. Proctoclysis was instituted and all fluids and solids withheld by mouth. By the fourth day the temperature had dropped to normal. Small amounts of water were then given by mouth. May 30, a second roentgenogram showed the pin still above the cardia. Esophagoscopy was again attempted but again was given up on ac-

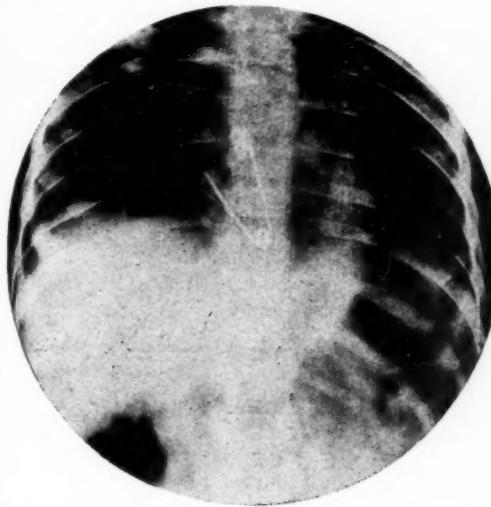


Fig. 1. Location of safety pin in esophagus at time the patient was admitted to the Clinic.

Such methods, although sometimes successful, are attended by too much risk to be instituted at any time, but especially when the foreign body has a sharp edge or is pointed and rough.

Two cases that recently came under our observation at the Mayo Clinic demonstrate the value of expectant treatment, and one case especially illustrates the difficulties



Fig. 2. Same case as Figure 1, three weeks after admission.

count of the ulcerated condition of the esophagus. Soon after, the child was put on a soft diet which she took without trouble. June 12 a roentgenogram showed that the pin had passed into the stomach (Fig. 2). The following day it was passed by rectum (Fig. 3).

Case 2: A child, aged two and one-half years, swallowed a padlock key about 6 cm. long, August 21, 1925. No manipulation was attempted. On roentgenographic examination two days later the key was found in the stom-

*From the Section on Medicine, Mayo Clinic, Rochester, Minn.

CASE REPORTS

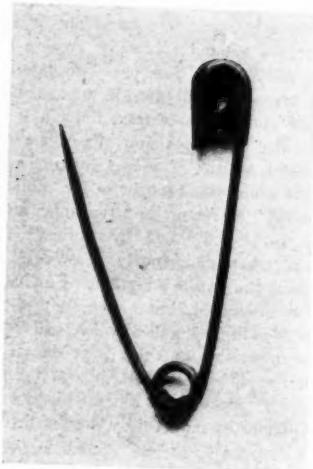


Fig. 3. Safety-pin passed by rectum.

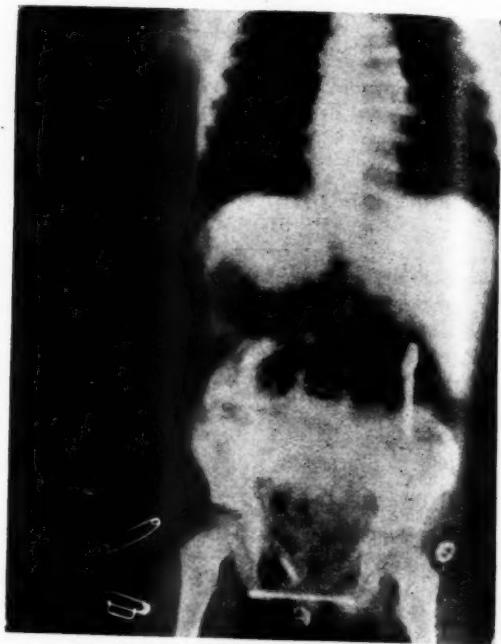


Fig. 5. Same case as Figure 4, seven days after admission.

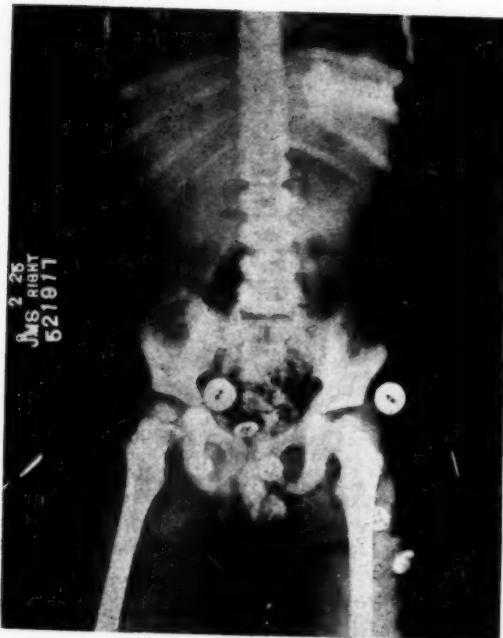


Fig. 4. Position of key in the stomach at the time the patient was admitted to the Clinic.



Fig. 6. Key passed by rectum. Actual size.

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ach (Fig. 4). Gastrotomy was advised, but the parents refused to give their consent and the child was brought to the Mayo Clinic for treatment. On admission the patient was given full diet and kept under observation (Fig. 5). Eight days later the key was passed by rectum without trouble. (Fig. 6).

These two cases illustrate fairly well the value of expectant treatment. While esophagoscopy is always indicated in cases of foreign body lodged in the esophagus, when it can be carried out correctly, still the expectant course is always preferable when the requisite equipment and skill are not available, until the patient can be put under competent care. Furthermore, as a general rule, anything that will enter the stomach will pass on through the gastrointestinal tract provided no obstructive lesion is present.

DARLING'S HISTOPLASMOSIS IN THE UNITED STATES: THE POSSIBILITY OF THE FURTHER OCCURRENCE OF CASES*

WM. A. RILEY, Ph.D., and C. J. WATSON, M.D.

Minneapolis

At the annual meeting of the American Association for the Advancement of Science held the latter part of December, last, the writers reported on the occurrence of a case of Darling's histoplasmosis in a Minnesota woman who had not been out of the State in forty-two years. More detailed accounts dealing with the clinical and parasitological aspects of the case are in course of publication.

With one exception, the press notices which have come to our attention have been accurate. The exception is the implication that since the disease is tropical we do not consider it probable that other cases would be encountered in Minnesota. Since this is diametrically opposed to our belief in the matter, it seems desirable to make a correction.

Previous to the recognition of the Minnesota case, Darling's histoplasmosis was known only from his reports of the three cases seen by him in the Ancon Hospital, Canal Zone, Panama, in 1905-1906. The patients were two Martinique negro laborers and a Chinese, the last mentioned having lived in Panama for the 15 years prior to his death. No other cases were noted in 33,000 admissions to the Ancon Hospital and until now none have been reported from that source or elsewhere in the succeeding twenty years.

Under the circumstances, it is natural that the idea should prevail that in histoplasmosis we have a rare tropical disease. In the latest edition of the Reference Handbook of the Medical Sciences, Dr. L. B. Bates, 1923, says regarding it: "Although no cases have been seen in Panama since 1906, it is probably to be found in unhygienic and less salubrious regions of tropical America not yet disturbed by the sanitarian."

As we attempted to point out, the finding of an endemic case of histoplasmosis in Minnesota is evidence that it is

not a purely tropical disease but that it must be considered as a possible factor in any obscure case of splenomegaly, accompanied by irregular pyrexia, emaciation, and anemia. Special consideration should be given to the possibility that the disease is a type of epizootic lymphangitis of horses, the causative organisms being strikingly similar in the two diseases.

In view of the reported success of the treatment of epizootic lymphangitis by salvarsan, splenic puncture for the purpose of determining the presence of the characteristic, encapsulated parasites in the endothelial cells would be suggested. Smears so obtained should be stained by Romanowsky's, Giemsa's, or even Gram's method in order to bring out the parasites in unmistakable manner.

FLY MAGGOTS IN ULCER OF THE LEG: REPORT OF A CASE*

S. E. SWEITZER, M.D., and E. H. WANGELIN, M.D.

Minneapolis

The patient, a man, aged thirty-eight years, entered the Minneapolis General Hospital July 12, 1925, complaining of ulcers on his legs.

About six months previous to admission he had noticed a small pimple on the left leg. He applied carbolic acid salve and bandaged the leg, but the lesion increased in size. About three weeks before his entrance to the hospital similar ulcers formed on the right leg. Carbolic acid salve and iodin were applied and the leg was bandaged. The patient had been seen in the Out-Patient Department about a week prior to his admission and at that time he was advised to enter the hospital, but did not do so. Shortly after sleeping in a park, the day previous to admission, he noticed maggots in one of the ulcers.

Examination revealed a poorly nourished and poorly developed male. Ulcers were present in the lower third of both legs, with maggots infesting a large ulcer on the left leg. Urinalysis was normal; the hemoglobin was 90 per cent; w.b.c. 8,100; blood Wassermann negative.

The lesions were cleaned with alcohol and a weak solution of copper and zinc sulphate in saturated camphor. This was applied as a continuous wet pack. The maggots disappeared in two days and the lesions began to heal slowly. After about three weeks granulation tissue was scraped from the wounds and a 25 per cent solution of silver nitrate was applied. This was done several times and little progress was noted. Several lamp therapy treatments were also given, without apparent benefit. At the end of about six weeks the cage was placed over the lower part of the legs so nothing could touch the ulcers, and the wounds were allowed to dry. They improved slowly, with crust formation. Three weeks later, diachylon was applied to soften the crust. When this was removed some epithelial growth was noted. The wounds were clean but not healed. On the whole the progress has been very slow.

*From the dermatological service, Minneapolis General Hospital.

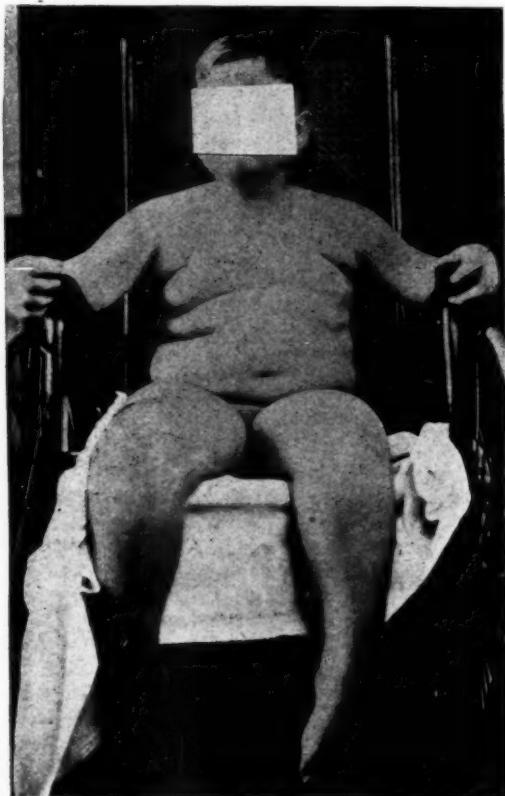
*From the medical department of the University of Minnesota.

THE ENDOCRINIC TYPE OF MUSCULAR DYSTROPHY: REPORT OF CASE

C. EUGENE RIGGS, M.D.

St. Paul

Through the courtesy of Dr. Wallace Cole, I had the opportunity of examining J., a boy, 10 years of age. He had whooping-cough at ten months; measles at three and a half years; walked and talked at eighteen months. At five years he became unsteady on his feet, stumbled easily, walked on his toes. Later his parents noticed that the calves of his legs were enlarging—typical tea-kettle calves. Then a marked lordosis became noticeable. Two years and five months after the initial symptoms, his arms were attacked. At present, the trunk muscles are so weak that he cannot sit upright, unaided by his hands.



The onset was as usual, but the rapidity of evolution is exceptional, as the progress of this disease is generally slow. Since the muscular dystrophies resemble in many points the muscular atrophies, at one time they were supposed to be due to a cord lesion. This was before neuropathology had come into its own. The muscular dystro-

phies are "a primary degeneration due to an inherent nutritional weakness of the muscle" (Dana). They are frequently associated with endocrinic defects, but as to the myopathies being due to these, further confirmation is necessary.

I was not allowed to make the metabolic or biochemical blood examination indicated, nor to have radiographs made of the skull nor of the chest for a possible thymus. These findings would have advised us as to the required therapy. In the muscular dystrophies the thyroid, pituitary and thymus gland extracts have been used. There can be no question but that the ductless glands are an important factor in this type of dystrophy. Dr. Timme says that on treatment some of these patients can be kept from deteriorating for years, but that most of them degenerate and become bedridden fairly early. In the muscular dystrophies, the muscles most commonly hypertrophied are the calf muscles, the glutei, the vastus externus, the deltoid, the supra and infra spinati, biceps, the temporal muscles and the tongue. Those usually atrophied are the anterior tibial muscles, the peronei, the flexors of the knee, the lower half of the pectoralis major and the latissimus dorsi. In our patient, because of the endocrine factor, the usual clinical picture is so masked that all boundary lines are lost and the distinction between hypertrophied and atrophied muscles is largely a matter of guess.

The great rolls of flesh on the chest and abdomen are particularly conspicuous.

During my lectures at the University, I taught my students that these patients usually died of an intercurrent disease, in exceptional instances living to be fifty or sixty years of age. We did not know then, as we know now, that in a large proportion of cases there is a persistent thymus, that there are definite lesions in the musculature of the gastro-intestinal tract similar to those found in the skeletal muscles and that there was a myopathic heart; that although the changes in it are milder, yet they are in every way typical of those seen in the muscles. To me at that time, sudden death occurring in the myopathies in the absence of infectious disease, was inexplicable, but with our later knowledge, its avenue of approach—the thymus, the diaphragm, the heart—is clearly apparent.

THE TREATMENT OF PERTUSSIS BY RECTAL INJECTIONS OF ETHER

FRED H. STANGL, M.D.

St. Cloud, Minnesota

After reading the report of Castorina* in 1923, suggesting intramuscular injections of ether in the treatment of pertussis, the method was employed by us with most encouraging results.

One great objection presented itself, namely, the pain of injection in every instance and the occasional necrosis at the site of injection in two instances. This in no way

*Castorina, G.: The Ether Treatment of Whooping Cough. *Pediatria* 31:151, February, 1924.

detracted from the benefits in reducing the symptoms of pertussis, but made us limit the use of intramuscular injections of ether to the severe cases only. The technic generally used was the daily injection of 1 c.c. of anesthetic ether into the gluteus muscle group and on an average five to six injections were given to each patient.

The publicity given the use of ether in oil for obstetrics suggested this as a means of administering ether in treating patients having pertussis and in September the first patient was seen. This patient had been ill nearly two weeks and the treatment given was one daily injection high into the rectum of one-half ounce of olive oil containing 2 c.c. of anesthetic ether. After the first injection this child's vomiting stopped and there was a reduction of 75 per cent in the paroxysms and sleep was much better. Following the third injection no more paroxysms occurred. Treatment was continued for two weeks and then stopped with the child entirely free from symptoms.

In all, seventeen children have been treated by this method during the past three months and the age has ranged from ten months to seven years. Best results were obtained in children in whom treatment was begun one week after the onset of the disease. Calculating the benefits, definite improvement was observed in 85 per cent of the patients treated. The most striking improvement was the control of vomiting, which was always either entirely controlled or greatly relieved. Next in order, the nights of the patients were more restful and where indifferent benefits were noted, it was in the control of paroxysms.

The technic followed consists in supplying the mother with a bottle of cottonseed oil, having 4 c.c. of anesthetic ether to the ounce, a male urethral catheter and a rubber rectal syringe. The mother is instructed to inject one-half ounce of the oil about 8 or 10 inches up into the rectum once every day, during the late afternoon or early evening. In severe cases a similar injection has been given in the morning. No drowsiness has been noted from the use of ether in these amounts.

CONCLUSIONS

Ether has a very definite benefit in a large percentage of patients suffering from pertussis and has proved much more satisfactory in our hands than treatment with vaccines and all types of medicines given by mouth.

The use of ether as outlined is harmless and the technic of rectal administration is simple.

Ether probably acts as a non-specific remedy by its excretion through the lungs and its presence in the air passages.

Sulphuric or anesthetic ether, therefore, is a valuable addition to our present methods of treating pertussis.

Nephritin.—The present claims for Nephritin appear to be substantially the same as those advanced in 1907 when the Council on Pharmacy and Chemistry in its report, "Reed and Carnrick's Methods," declared this preparation along with others inadmissible to New and Non-official Remedies. (Jour. A. M. A., Dec. 12, 1925, p. 1909.)

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:

F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH

THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

A PROGRAM OF RESEARCH ON THE ACTION OF LIGHT ON LIVING MATTER: Brian O'Brien (American Review of Tuberculosis, 1925, XI, 486). The principles underlying the physiological action of light have been very little understood and even clinical interpretations on an empirical basis have seldom been accurately drawn. Claims have been, and are being, made for a number of forms of light treatment which have been supported by very little exact data.

In spite of this the possibilities of light treatment cannot well be overlooked. Some very excellent and encouraging results have been obtained, most strikingly, perhaps, in rickets, and notably also in all extrapulmonary forms of tuberculosis, in various nontuberculous skin conditions, and in such systemic infections as osteomyelitis.

In view of this, as well as the many important results being obtained in photochemistry, and the extensive information which light physics is yielding in the field of atomic and molecular structure, there is ample justification for fundamental research in the reactions of life to light.

The writer proposes that the investigations under discussion be limited to the biological effects in the electromagnetic spectrum from short gamma-radiations up to as long wave-length x-radiation as will travel a considerable distance through air (about 20A.), stop here, and take up the electromagnetic spectrum again at 1850A., the shortest ultraviolet that will travel through appreciable air-paths.

For the measurement of the total energy in a light beam, per unit cross-section and unit time, some form of total radiometer is required.

For the dispersion of the light beam and the measurement of wave-length, some form of spectrometer is necessary.

In the x-ray and gamma-ray region the type of measurements (intensity and spectral distribution of energy) is the same as for light, but the methods are somewhat different.

In order that the amount of radiation absorbed at every wave-length may be known, the reflection coefficients and if the object is at all transparent, the transmission coeffi-

clients must be determined throughout the whole radiation spectrum.

All the foregoing tests must be applied to all of the research proposed in the accompanying outline in order that the optical conditions under which the work is done will be established beyond question.

Having measured the light in the above manner, many details regarding the effects produced must be noted, such as weight change, temperature, basal metabolism, food consumption, excreta and rate, respiration rate, heart rate, blood changes, skin changes, etc.

A. T. LAIRD, M.D.

LOCAL IMMUNIZATION OF TISSUES OF THE NOSE, THROAT AND EAR BY BACTERIAL VACCINES: Harol M. Hays, M.D., New York (*Archives of Otolaryngology*, October, 1925, p. 321). The hypodermic injection of vaccines for nose and throat conditions has not been successful. Local application of these vaccines to nasal membranes should appeal to nose and throat men. Prof. Besredka, of the Pasteur Institute of Paris, has prevented typhoid fever in rats by local administration of typhoid vaccine.

METHOD OF PREPARING THE VACCINE

A culture is made with a sterile swab. Cultures are taken from the throat or ear canal or pus from nose or posterior part of nose—and sent at once to the laboratory before drying out, and grown in broth for 48 hours. The bacteria are then killed.

METHOD OF APPLICATION

In nasal conditions: the nasal mucosa is cleaned with hot alkalis, and it is better not to use shrinkage with cocaine or adrenalin. At intervals of three to four days the nose is packed with gauze strips soaked in the vaccine. In ethmoiditis, the pack should be placed between septum and middle turbinite and left in place for one-half hour. In antrum disease, the antrum should be washed and the vaccine injected into the antrum cavity. The patient is also to use vaccine spray twice a day at home. In children the vaccine may be dropped into the nose with a medicine dropper instead of using packing. Throat conditions are not so well treated, because there are no cavities to pack. Ear infections treated by packing canal, and furunculosis and middle ear conditions respond well. Its use in mastoid wound and on packing wick also proved valuable.

All types of cases treated where there was free pus.

RESULTS: 200 cases treated, 61 cured, 92 improved markedly, 10 unimproved and 37 questionable. Sinus conditions did best when suction was used before the application.

CONCLUSIONS

1. Cultures for nose, throat or ear can be readily made.
2. A simple technic without isolation of specific bacteria will produce a practical vaccine.
3. The application of vaccines locally is a painless procedure and acts directly on the tissues infected.
4. The vaccine seems to act more beneficially in purulent conditions which can be reached directly.

5. Nasal sinus infections seem to respond more readily than other conditions.

6. The local application to slow healing wounds, particularly to bone infections, seems to create an antiseptic and stimulating effect.

7. The local application of vaccines can be made in many cases when patients will not submit to hypodermic injections.

DR. E. L. ARMSTRONG.

SURGERY

SUPERVISORS:

DONALD K. BACON,
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THE VALUE OF BLOOD TRANSFUSION IN SURGERY OF THE PROSTATE: Austin I. Dodson (*Annals of Surgery*, 1925, lxxii, p. 974). Blood transfusion is a valuable adjunct in the preoperative preparation of patients suffering from prostatic hypertrophy.

In a series of 147 deaths following prostatectomy, Deaver found hemorrhage and shock occupying second and third places as a cause of death. Blood transfusion is most valuable in combating these two complications. The vessels of these old men are sclerotic and they are unable to adjust themselves to the rapid loss of blood. Saline and glucose injections are good for temporary relief but in shock and hemorrhage these fluids are rapidly lost, and then, too, they do not contain the important cellular elements of the blood.

The author feels that the direct transfusion of whole blood is the most efficacious treatment of hemorrhage and shock in the postoperative prostatic patient. Transfusion in all the author's uncomplicated cases in every instance brought about a return of a satisfactory blood pressure and good recovery. He advocates blood grouping as a part of the preoperative preparation for every prostatectomy.

C. S. WILLIAMSON, M.D.

PEDIATRICS

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EXTREME LEUKOCYTOSIS IN PERTUSSIS: Roland P. Seitz, M.D. (*Amer. Jour. of Diseases of Children*, November, 1925). The marked leukocytosis occurring in pertussis is generally recognized and frequently used in the diagnosis of mild and obscure cases of the disease. Meunier made repeated blood counts on 104 cases. The

average of his maximum counts was 27,800 per cubic millimeter, and he obtained 23,700 as the general average at the height of the disease. Several leukocyte counts exceeded 40,000 and the highest noted was one of 51,150.

The highest leukocytoses are usually met with in pertussis-pneumonia. Cabot reports a case of a child, aged 6 years, which had a white blood count of 94,600, of which 69 per cent were lymphocytes. The second case was that of a baby, aged 15 months, where the leukocytes numbered 103,000 and 64.5 per cent of them were lymphocytes.

Cabot also refers to a case of "bronchopneumonia" with paroxysmal cough. A maximum leukocytosis of 227,810; polymorphonuclears, 33.6 per cent, and lymphocytes, 50.2 per cent, was observed.

Reiche mentions a case of pertussis complicated by influenza with a leukocytosis of 172,000; polymorphonuclears 56.3 per cent; lymphocytes 43.6 per cent.

In a survey of the literature, Austrian found leukocytoses in excess of 100,000 reported in the following conditions: multiple carcinoma; gangrenous appendicitis, complicated by hemorrhage from a duodenal ulcer; lobar pneumonia and splenohepatic cirrhosis.

Various explanations are advanced to explain the lymphoma observed. Meunier thinks it is in part due to the extreme congestion of the tracheobronchial lymph glands, and cites as evidence the remarkable multiplication of the lymphogenous cells.

Reiche explains his high count on a basis of the mixed infection. Hess concludes that the lymphocytosis is a secondary mechanical effect, that is, the paroxysms, by increasing intra-abdominal pressure, squeeze lymphocytes out from the spleen and thoracic duct into the circulation.

White blood counts exceeding 100,000 may represent extreme leukocytoses and should not be confused with acute leukemia. In the presence of such large numbers, a careful investigation should be made to rule out pertussis as the primary disease.

The number of blood platelets, nearly always greatly reduced in acute leukemia, is of value in making the differential diagnosis.

R. N. ANDREWS, M.D.

TRANSFUSION AND INJECTION OF BLOOD IN PEDIATRIC PRACTICE: A. Hymanson, M.D. (Arch. of Ped., July, 1925). Blood injection may be regarded as a substitute for transfusion. The indications for both transfusion and injection have gradually increased in number and variety. Originally the chief, if not sole, indication was hemorrhage, especially in the new-born. Other hemorrhagic conditions that were early agreed upon as indications are purpura and hemophilia. In cases where there has been no great loss of blood, small and repeated transfusions are said to give better results than large ones.

Still another group of cases comprises profound disturbances of nutrition in young infants. A test of a successful transfusion is the change in the color of the child and when the face becomes of pinkish, healthy hue, the operation is to be discontinued. When repeated transfusions are indicated the author advises the use of different donors.

In the new-born, a transfusion may vary from 60 to 155 c.c. of blood and in older children up to 500 c.c.

The author states that there is a marked difference between transfusion in the old and transfusion in the very young. In the former it is only a matter of simple addition; but in the infant there is a definite stimulating action on the bone marrow.

In conclusion the author states that transfusion and intramuscular injection of blood have been gradually winning their way as very important additions to our therapeutic armamentarium and that we are learning daily to increase the sphere of their usefulness.

R. N. ANDREWS, M.D.

ROENTGENOLOGY

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ROENTGEN TREATMENT OF GLANDULAR TUBERCULOSIS: Amundsen (Acta Radiologica, Vol. 4, p. 340, Aug., 1925). The results of treatment in 150 cases of glandular tuberculosis after 2 to 9 years' observation are reported.

The cases are divided into three groups:

1. Simple hypertrophy. There were 81 per cent cured and 9.4 per cent improved.
2. Glandular hypertrophy with periadenitis. There were 49 per cent cured and 35.5 per cent improved.
3. Suppurative glands with fistulae. There were 77.4 per cent cured and 9.4 per cent improved.

Relapses occurred in 4 per cent of the cases. In 10 per cent there were skin changes due to too persistent treatment of fibrous glands which should be extirpated after they have become entirely quiescent.

Abscesses should be opened and drained before further treatment.

LEO G. RIGLER, M.D.

THE ROENTGENOGRAM IN EARLY SCURVY: Pelikan (Am. Jour. Dis. Child., V. 30, p. 174, Aug., 1925). Owing to the vagueness of the symptoms and signs, the clinical diagnosis of scurvy, before hemorrhages have appeared, is somewhat difficult. On the basis of experimental work on guinea pigs and clinical experience with scurvy it is shown that the earliest diagnosis can be made by means of roentgenograms of the joints, particularly the knee joint.

The most important roentgenographic signs in a well developed case are: 1. A finely irregular, broadened, well calcified epiphyseal line. 2. A small spur on the lateral edge of the epiphyseal line with occasionally dislocation of the entire epiphysis. 3. An area of decreased density immediately back of the epiphyseal line. This was for-

merly called the "Trummerfeld zone," but is renamed "scurvy line" by the author because it is the most characteristic bone lesion of scurvy. It is due to a lack of calcification of the newly formed spongiosa. 4. A very thin cortex, often merely a narrow white line. 5. Glass-like transparency of the shaft with loss of trabeculations. 6. A broad, finely irregular, white edge on the epiphyseal center of ossification of the long bones.

Less advanced cases may fail to show the lateral spur of the epiphyseal line. Healing scurvy will show calcifying subperiosteal hemorrhages near the epiphyses.

The above findings are present usually when the clinical diagnosis is quite apparent. In the borderline cases only the broadened epiphyseal line, the dense line around the epiphysis, and the absence of trabeculations in the shaft are present. The diagnosis can be made even though the "scurvy line" be absent.

The ground glass appearance of the shaft is probably the earliest sign and this appearance in the roentgenogram will aid greatly in the early diagnosis of scurvy before symptoms have become prominent.

LEO G. RIGLER, M.D.

INTESTINAL DIVERTICULA: Spriggs and Marxer (*Quart. Jour. Med.*, Vol. 19, p. 1, Oct., 1925). This paper is based on the findings in 1,000 consecutive radiological examinations of the alimentary canal, residues of barium having been detected in intestinal diverticula in 143 patients.

(1) Diverticula of the small intestine: These were observed in the duodenum in 38 patients in this series. The routine barium meal was used, and the diverticulum brought into view and its various profiles shown either by rotation of the body or shifting of the tube. The existence of an accessory pocket was proved by demonstrating with the screen and recording on a film, both during the passage of barium and at a later stage, an opaque residue, after the gut from which it arose is empty.

Authorities have considered these diverticula to be of congenital origin, but the authors are inclined to think that the duodenal pouches are caused by extrusion of those parts of the bowel wall which are weak naturally or made so by ulceration or other pathological processes. The condition is progressive, as is shown by 2 patients who were re-examined after 4 and 7 years respectively, the development of a pouch from a small to a considerable size being observed. In this series there is only one pouch of the first part of the duodenum. The second part is the commonest site, 30 out of the 51 pouches observed being situated there. Small shadows near the ampulla of Vater have often been seen and have been interpreted as opaque food in the papilla. On re-examination after long intervals, the authors are inclined to regard many of these as incipient diverticula.

Diverticula of the jejunum were observed in 7 patients, 4 of these also having pouches in the duodenum. In the ileum, they found only small diverticula varying from a mere pin-head projection to the size of a lentil, these being observed 7 times. These do not appear to be of the same

kind as the large pouches seen in the duodenum, but are like the early stage of multiple colic diverticulosis. The appendix was found to be the site of diverticulosis in 6 cases.

(2) Diverticulosis of the large intestine is frequent, having been observed in 100 out of 1,000 cases. The diverticula are small and multiple, and may be found in any part of the colon, but are commonest in the pelvic colon.

A prediverticular state can be recognized radiologically, characterized by fixity of the affected part, with a ragged outline of the wall of the bowel which does not dilate even in the most favorable position. If one aspect only of the wall is involved, the contraction is less marked. These areas are generally small and limited, although the entire colon has been involved in little patches. It is while this stage of the disease is in progress that the minute herniae which later constitute the necks of the diverticula, are pushed through. A local pericolic inflammation may simulate this appearance, and must be ruled out in their diagnosis.

At a later stage of the prediverticular state, if a fairly large area is involved, an irregular segmentation, broad and deeply serrated, with narrow haustra, may be observed, and some of the little pockets become visible. These infant diverticula gradually increase in size, and have been observed to increase to a diameter of 5 mm. in one year. The approximate number of developed diverticula is best seen after the evacuation of the opaque meal.

The third stage of diverticulosis is called diverticulitis. Inflammation has now spread from the pouches to the walls of the bowel and surrounding parts. When the area involved is small and more ring-like the appearance is that of a row of slender spikes, parallel or at various angles. These are rigid, and contrast with opposite and adjacent haustra which are overactive in changing their shape. The lumen of the bowel may become occluded as the result of these hypertrophic changes, and subacute or acute obstruction result.

Infectious foci are considered to be the etiological factor. The frequency of location, the symptoms, the treatment, and the prognosis are discussed at length.

WALTER H. UDE, M.D.

EYE, EAR, NOSE AND THROAT

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THE ACTION OF THE SOLUXLAMP IN DISEASES OF THE EYE: Dr. Franz Esser (*Deutsche Medizinische Wochenschrift*, October 2, 1925, p. 1665). That local heat exerts a favorable influence on many eye diseases is well known. However, there are objections to some of the methods of its application, notably the difficulty of gauging

accurately the intensity of the heat dose, with the consequent danger of a skin burn.

Of the various appliances which have been used, the electric thermophores have been the most pleasant and effective, yet even with these there is danger of a burn, and of inability to regulate the dosage accurately when there are variations in the electric current. These evils seem to be avoided by the use of Dr. Cemach's "Sollux-lamp" (made by Quarzlampen-Gesellschaft Hanau a. Main, Germany).

The action of this lamp is purely thermal, since almost all rays of short wave-length are absorbed by means of the attached filter, and only the heat rays of long wavelength become effective. After an irradiation of 10 minutes at 20 cm. a thermometer reads 35° C., at 10 cm., 48° C. There is no rise in the body temperature, that is, the warming effect is essentially superficial.

The lamp may be used by patients in both the sitting and lying positions. The attached color-filters increase its utility for various purposes: The daylight disc makes it purely an illuminating lamp, as for operations; blue-filtered rays, here also available, are credited with an anodyne action; while the red disc makes it a heat-generating mechanism.

Thus far 124 cases have been treated with the Sollux lamp, including, in diminishing number, kerato-conjunctivitis eczematosa, keratitis herpetica, disciformis and parenchymatosa, conjunctivitis catarrhalis, chronic and subacute, iritis, ulcer serpens, ulcer marginale, trachoma, infections after perforating injuries, lime burns, episcleritis, sympathetic ophthalmia, lid abscess, plastic lid operations and acne rosacea. After irradiation all except two cases showed a marked improvement.

Best results were obtained in children with eczematous keratoconjunctivitis, especially in those with severe blepharospasm. Even in cases of the most severe photophobia the lids were spontaneously opened, at times after the very first irradiation, and in all cases after the third or fourth. This result was especially striking in small children, in whom lack of co-operation had previously precluded accurate examination. Adults with painful, irritated eyes were similarly relieved, some becoming actually sleepy. In keratitis parenchymatosa the irradiation seems to increase and hasten new vessel formation. In stubborn cases of chronic conjunctivitis the foreign-body sensation, the burning and the smarting disappeared almost immediately and stayed away for a considerable time. In each case, the usual local measures were employed.

The Solluxlamp is simple to operate. The patient himself can regulate the heat supply by varying the distance between the lamp and the eye. It is advisable to begin with an irradiation of 20 minutes at 20 cm., the daily treatments to be gradually increased to 60 minutes and the distance diminished to 10 cm. Usually one application a day suffices. In resistant cases two treatments daily may be given without untoward result.

VIRGIL J. SCHWARTZ.

VISUAL HALLUCINATIONS IN SANE PEOPLE:

Arthur W. Ormond (British Medical Journal, Aug. 29, 1925, p. 376). A considerable number of persons perfectly sound in mind and body, at times perceive images of objects which they do not see, and which, indeed, may not exist. These may take the form of "faces"—comical or grotesque or terrifying—of numbers—of words, complete or incomplete—of lights encircled by areolæ—of moving lines of streaks—of colors—of pictures—of animals, especially if there has been some association with such animals, as for instance, horses, or a deep repugnance for them, as for instance, spiders.

It is important to determine if these hallucinations are to be accounted for by organic pathology in the eye, or by central functional changes. Occasionally retinal, choroidal or arteriosclerotic changes have been demonstrated, but in the great majority of cases no ocular disease could be found. The cause, therefore, is probably an oversensitivity of certain areas of the brain. Most people can normally visualize accurately—that is, they can form in their minds a definite picture of objects or people, entirely subjectively *but only by mental concentration and for a limited period*. Others have a power and a facility for visualization so strong that they "see" without effort—nay, despite efforts to prevent it—various faces, figures and objects; that is, they have visual hallucinations. This is probably due to a hypersensitivity of the visual memory centers, such that effects which are ordinarily produced by definite visual stimuli may now occur as a result of aberrant stimuli. These centers and their immediate connections are believed to be in the angular, the inferior parietal and the occipital lobes, not far from the centers for word blindness which are in the left angular gyrus.

Another group of cases may have these "visions" with less facility and distinctness than the above class, but still without concentration or desire to bring them on, and may retain them for a considerable time. This constitutes an intermediate class of moderately hypersensitive centers.

Class I would be, therefore, the severe type—true visual hallucinations.

Class II would be the intermediate type just referred to.

Class III would be the ordinary visualization of normal people.

Class IV is a type wherein persons do not memorize by vision at all, that is, they have weak retentivity.

Class V is the exact opposite of Class I, that is, "word blindness" or "mind blindness" or "letter blindness."

Such persons cannot visualize letters, words or objects no matter how long nor how frequently they may have looked at these. Any of these conditions may be present in people who are perfectly sane and apparently in excellent health.

Treatment is unsatisfactory; tonics, bromides and other general measures may be tried. In the few cases wherein organic ocular pathology can be found, treatment should be directed, of course, at this condition.

VIRGIL J. SCHWARTZ.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

PYGMALION. R. M. Wilson, M.B., Ch.B. 68 pages. Cloth, \$1.00. New York: E. P. Dutton & Company, 1925.

THE ART AND PRACTICE OF MEDICAL WRITING. George H. Simmons, M.D., Editor and General Manager Emeritus, American Medical Association, and Morris Fishbein, M.D., Editor, Journal of the American Medical Association, Chicago. 164 pages. Illus. Cloth, \$1.50. Chicago: American Medical Association, 1925.

THE SURGERY OF PULMONARY TUBERCULOSIS. John Alexander, B.S., M.A., M.D., Asst. Prof. of Medicine in the University of Michigan, etc., with introductions by Hugh Cabot, M.D., C.M.G., L.L.D., F.A.C.S., and Edward Baldwin, M.A., M.D. 356 pages. Illus. Philadelphia and New York: Lea and Febiger, 1925.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES. 314 pages. Illus. Washington: Government Printing Office, 1925.

THE SURGERY OF PULMONARY TUBERCULOSIS. By John Alexander, M.D., with introductions by Hugh Cabot, M.D., and Edward R. Baldwin, M.D. Octavo,

356 pages with 53 engravings and 12 plates. Philadelphia, Lea and Febiger, 1925.

This book fills a genuine need which has been sharply realized by physicians interested in securing accurate information regarding the much heralded resources of surgery in the treatment of certain cases of advanced pulmonary tuberculosis. The author's own experience in such procedures and all the work along these lines that is being done in this country and Europe are summarized fully and clearly. The bibliography includes five hundred references. Dr. Alexander has performed a most valuable and timely service in demonstrating to the profession, under extraordinary difficulties, the value of a new resource in the treatment of tuberculosis.

A. T. LAIRD, M.D.

THE NORMAL DIET. W. D. Sansum, M.D. C. V. Mosby.

This compact volume contains a concise discussion of food requirements and of a number of questions having to do with metabolism. The terminology is simple and plain. The author discusses food requirements and touches on the accessory food factors. He also briefly discusses acid and alkaline foods.

L. R. CRITCHFIELD, M.D.

GOOD LOCATION FOR PHYSICIAN IN NORTH DAKOTA—House and office in connection, for sale in a town of 500, central to four other towns without a physician, and in best section of Red River Valley; 40 minutes' drive to excellent hospital facilities; no competition; wide territory. Price and terms reasonable. Am leaving to join clinic. Address C-73, care MINNESOTA MEDICINE.

WANTED—Salaried appointments for Class A physicians in all branches of the medical profession. Let us put you in touch with the best man for your opening. Our nation-wide connections enable us to give superior service. Azroe's National Physicians' Exchange, 30 North Michigan Ave., Chicago. Established 1896. Member The Chicago Association of Commerce.

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PHYSICIAN, 33, well trained in Gynecology, some Surgery, graduated from Germany, U. S. A. license, good manners, wants to associate with elder colleague, preferably surgeon, or to buy a city practice after introduction. Speaks German, Spanish and French. Address C-66, care MINNESOTA MEDICINE.

EXPERIENCED LABORATORY TECHNICIAN desires position in Twin Cities or vicinity. Address C-72, care MINNESOTA MEDICINE.

YOUNG WOMAN, twenty years of age, graduate of South High School, Minneapolis, wishes clerical position or that as assistant in doctor's or dentist's office. One year's training in Minneapolis hospital. Address C-70, care MINNESOTA MEDICINE.

FOR SALE—Wappler E-Xell diathermy and large rotary converter, used four months. Reason for selling, formed partnership duplicating this machine. Can buy one or both. Address C-71, care MINNESOTA MEDICINE.

POSITION WANTED—By young woman who is a registered radiological technician, clinical laboratory technician and registered trained nurse. Excellent references. Address C-74, care MINNESOTA MEDICINE.

WANTED—Well qualified eye, ear, nose and throat man, good refractionist and operator, wants assistantship or location. Gentile, Protestant, excellent references. Address C-68, care MINNESOTA MEDICINE.

WANTED—Position as secretary-stenographer in hospital clinic or doctor's office. Five years' experience in medical and surgical dictation. Best of references. Write Nella H. Kokke, Warren, Minn.

FOR SALE—Haldane Basal Metabolism Apparatus, three unit, complete with tank and electric motor, in excellent condition. Price \$125.00. Address C-65, care MINNESOTA MEDICINE.

WANTED—A Pediatrician and an Aurist and Oculist to be associated in a Minneapolis Clinic. Address XYZ, care MINNESOTA MEDICINE.